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SCHEDULE OF MEETINGS

6-10 June	**Advisory Group on Veterinary Public Health, Geneva**
9-22 June	**Third Inter-American Statistical Conference, Rio de Janeiro**
4-28 July	**Nursing Education Seminar, Suva, Fiji**
25-30 July	**Expert Committee on Environmental Sanitation, fourth session, Geneva**
26-29 July	**European Regional Advisory Group on Water Standards, Geneva**

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POLIOMYELITIS IN 1953

The discovery by Enders and his colleagues that poliomyelitis virus can be grown in tissue culture, and subsequent developments in poliomyelitis research, " have transformed poliomyelitis from a disease which could be studied only with difficulty and at great expense, and for which no prospect of control was apparent, into a disease which can now readily and relatively cheaply be studied in the laboratory and for which there are encouraging prospects of effective control measures ". Successful application of control measures now under development will depend, however, on sound knowledge of the epidemiology of poliomyelitis in different areas—knowledge which is currently obtainable for very few places. It is largely for the purpose of stimulating further acquisition of this knowledge that the limited information now available on the epidemiology of poliomyelitis forms part of a recent article in the *Bulletin of the World Health Organization*, the latest study in the WHO statistical series on poliomyelitis.[1] Together with data on cases of, and deaths from, this disease in a number of countries and territories, age distribution of cases, and seasonal variations in incidence, such virological information as could be obtained has been included in this study.

REPORTED INCIDENCE

Africa

In 1952 and 1953 there was a serious rise in the number of notifications of cases of poliomyelitis in Egypt—260 and 551 cases registered, respectively, in contrast with a total figure of 76 for the period 1944-51. This increase is believed to be attributable largely to better reporting of cases.

For most of the rest of the African continent and islands, covering about forty countries and territories, the 1953 notifications (about 2170) differed very little from those of the previous year (2210). There was a considerable increase in apparent morbidity, however, in Angola, Middle Congo (French Equatorial Africa), Upper Volta (French West Africa), Morocco (French Zone), Tunisia, Ruanda-Urundi, Tanganyika, and the Union of South Africa. On the other hand, there was a drop in the apparent incidence in Mauritius, Uganda, Kenya, Algeria, Mozambique, Northern Rhodesia, and Southern Rhodesia.

In the Belgian Congo, the apparent morbidity figures rose as compared with those for 1952; 736 cases, with 59 deaths, were notified in 1953. Angola experienced a poliomyelitis epidemic in 1953 which, although less serious than the epidemic of 1951, was of considerable importance—378 cases and 19 deaths as compared with 764 cases and 60 deaths during the previous epidemic.

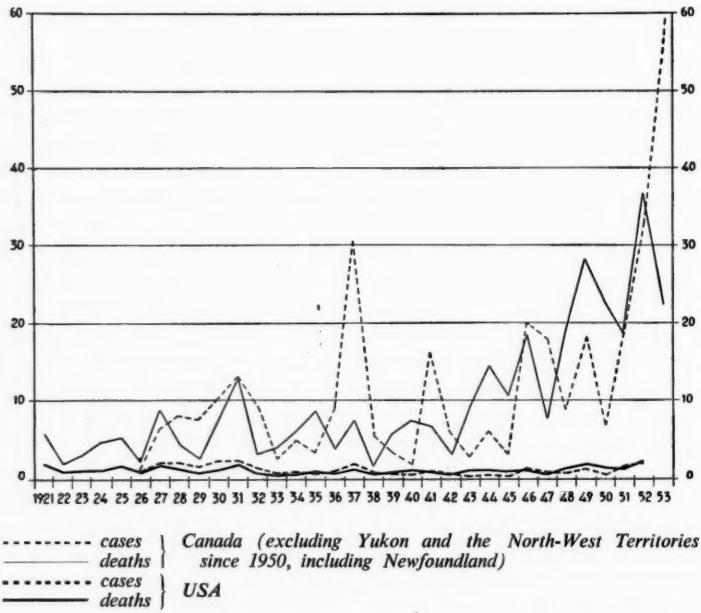
America

While there was an appreciable drop in the number of notifications of cases of poliomyelitis in 1953 in Chile, Cuba, and the USA, and a less marked decrease in Alaska, Guatemala, the Panama Canal Zone, Peru, Puerto Rico, and Venezuela, there was a substantial rise in apparent morbidity in Argentina, Brazil, Canada, Colombia, El Salvador, Greenland, Mexico, Nicaragua, and Uruguay. The disease reached epidemic proportions in Greenland.

In 1953 Canada had the most serious outbreaks of poliomyelitis ever recorded in

[1] Freyche, M.-J., Payne, A. M.-M. & Lederrey, C. (1955) *Bull. Wld Hlth Org.*, **12**, 595

FIG. 1. ANNUAL INCIDENCE OF POLIOMYELITIS : CANADA AND UNITED STATES OF AMERICA, 1921-53 (RATES PER 100 000 INHABITANTS)

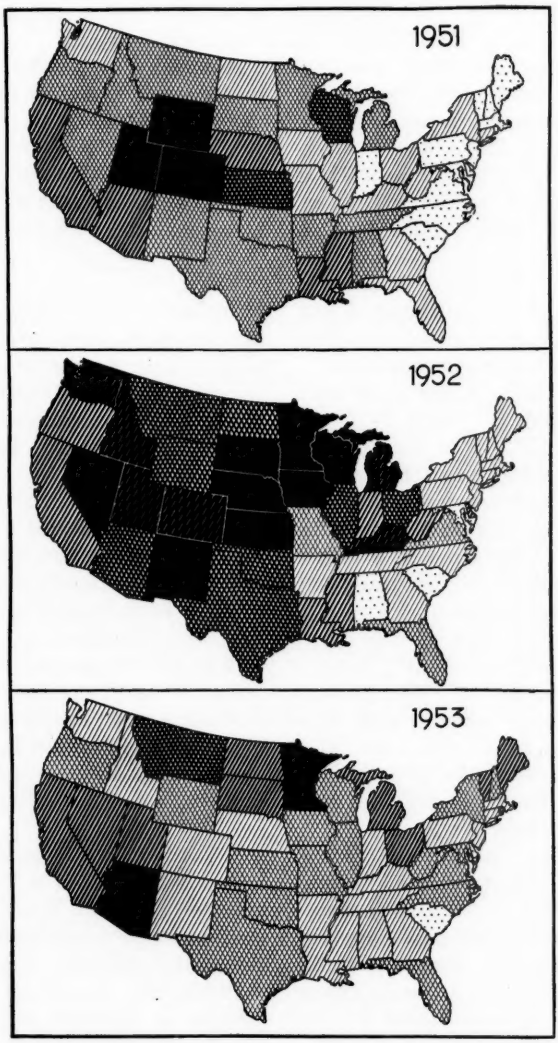

60
50
40
30
20
10
0
1921 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53
cases
deaths
Canada (excluding Yukon and the North-West Territories; since 1950, including Newfoundland)
cases
deaths
USA

its history. Notifications numbered 8734, an increase of 84% over the figure for 1952, which constituted the previous record. This exceptionally high incidence affected six provinces only : Newfoundland (233 notifications as compared with 4 in 1952); Quebec Province (488 as compared with 125); Ontario (2239 as compared with 705); Alberta (1425 as compared with 740); British Columbia (797 as compared with 596); and, in particular, Manitoba (2320 cases as compared with 839). The 2320 cases in Manitoba represented 27% of the total and exceeded the annual figures for Canada in most of the twenty-nine preceding years. It is interesting to note that the three provinces with the highest morbidity-rates were among those with the lowest average population density. The notification-rate for the country as a whole was 59 per 100 000 inhabitants, as compared with 33 in 1952 and 18 in 1951. This rate considerably exceeded the record rate registered in the USA in 1952—37 cases per 100 000 inhabitants.

Of the 8734 cases of poliomyelitis notified, 42% were paralytic forms of the disease, 35% non-paralytic forms, and 23% non-specified forms. In Manitoba, paralytic symptoms were noted in 30% of patients over 20 years of age. According to the available provisional data, there were 398 deaths in the country as a whole, the provisional mortality-rate being about 2.7 per 100 000 inhabitants. (The final rate for 1952 was 2.2)

In the USA there were 35 592 notifications of poliomyelitis in 1953, 39% less than in 1952, the record year. Of these notifications 60% were from ten States which contain 52% of the country's population : California,

FIG. 2. DISTRIBUTION OF POLIOMYELITIS : UNITED STATES OF AMERICA, 1951-3



Cases per 100 000 inhabitants

0.1-9.9 *10-19.9* *20-29.9* *30-39.9* *40-49.9* *50-59.9* *60+*

Preliminary rates based on annual figures published by the National Foundation for Infantile Paralysis

4078; New York, 2984; Ohio, 2635; Michigan, 2346; Minnesota, 2254; Illinois, 2041; Texas, 1751; Pennsylvania, 1471; North Carolina, 926; and Missouri, 877. Fig. 2 shows the 1953 notification-rates per State compared with those for the two preceding years. The most marked improvements were observed in Nebraska (231 notifications in 1953 as compared with 2247 in 1952); Iowa (613 as compared with 3564); Kentucky (368 as compared with 1762); New Mexico (108 as compared with 502); South Dakota (225 as compared with 1017); Idaho (97 as compared with 353); Delaware (32 as compared with 117); Colorado (194 as compared with 688); and Kansas (515 as compared with 1718).

Forty-four per cent. of the cases were registered as "paralytic", 34% as "non-paralytic", and 22% were non-specified forms. The provisional mortality figure is 346, giving an extremely low case-fatality-rate of about 1.3%. This is probably somewhat lower than the real rate, however, since the case-fatality-rate was never lower than 5.4% during the ten preceding years.

The situation in some of the other countries of the Americas was as follows :

Mexico—The number of notifications in 1953 (1787) has been exceeded only once since 1937 (in 1951).

Nicaragua—The available data indicate that this country suffered in 1953 the most serious epidemic so far observed.

Brazil—In the State capitals and Federal District of Brazil, the provisional notifications for 1953 (940 cases, 79 deaths) almost equalled the total for the eight preceding years.

Argentina—Provisional reports for the year give 2537 notifications ; there is reason to suppose that the final figures will be higher.

Asia

Throughout 24 Asiatic countries or territories, only about 3950 cases of poliomyelitis were notified in 1953—more than 1000 fewer than in 1952. This total does not include India, for which only hospital statistics are known, or Pakistan, where 22 cases were noted.

Although the available information is inadequate, it would seem that poliomyelitis morbidity decreased in Cambodia (where 1952 was an epidemic year), Ceylon, India, Israel, Lebanon, Philippines, and Thailand. In only a few countries were the 1953 figures higher than those for 1952.

Europe

Statistical data are available for 26 European countries or territories. About 27 000 cases of poliomyelitis were notified in 1953, as compared with 32 000 in 1952. Fifty-six per cent. of these occurred in three countries —England and Wales, Italy, and Sweden. Incidence increased in 15 countries and decreased most markedly in those which had been most affected by poliomyelitis in 1952 (Belgium, Denmark, Federal Republic of Germany, Luxembourg, and the Netherlands). In the latter countries only 4196 cases were registered in 1953, as compared with 17 863 the previous year.

Fig. 3 and 4 show the poliomyelitis morbidity- and mortality-rates for Scandinavia and Finland for the past 30-33 years, in so far as they are indicated by official statistics, and the distribution of the cases for 1950-3.

In Sweden the 1953 epidemic was the most serious ever recorded in that country : 5090 cases were notified, nearly 2000 more than in 1936, which was the previous record year. While final mortality statistics are not yet available, the provisional figures seem to indicate a relatively low case-fatality-rate as compared with the final rates for the years 1945-52. The age distribution of the 27 deaths from poliomyelitis noted in Stockholm during 1953 is interesting : 0-15 years, 1 death (between 10 and 15) ; 15-20 years, 1 death ; 20-40 years, 19 deaths ; 40-60 years,

FIG. 3. ANNUAL INCIDENCE OF POLIOMYELITIS: SCANDINAVIA AND FINLAND, 1921-53 (RATES PER 100 000 INHABITANTS)

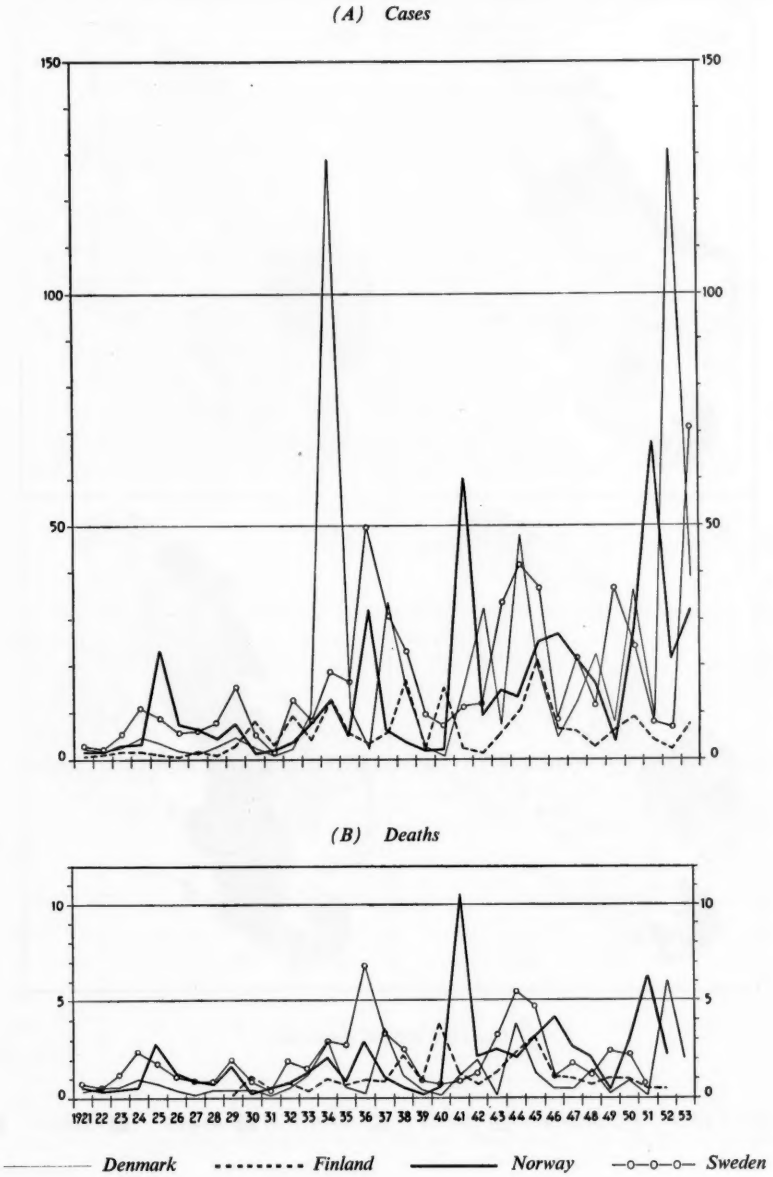


FIG. 4. DISTRIBUTION OF POLIOMYELITIS : SCANDINAVIA AND FINLAND, 1950-3

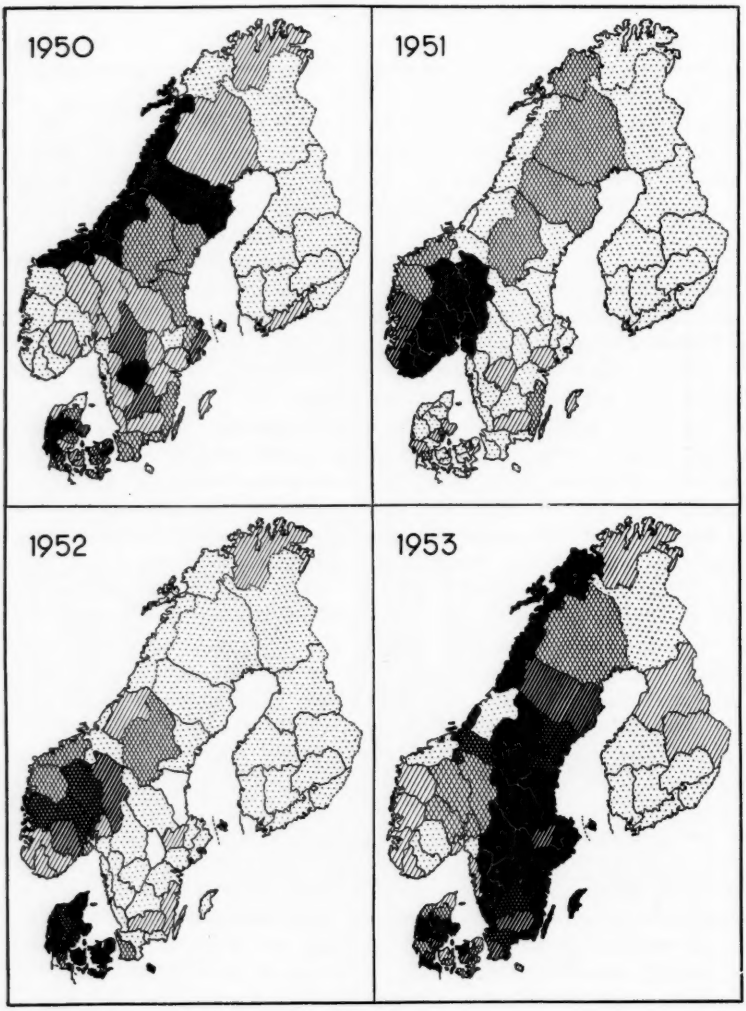
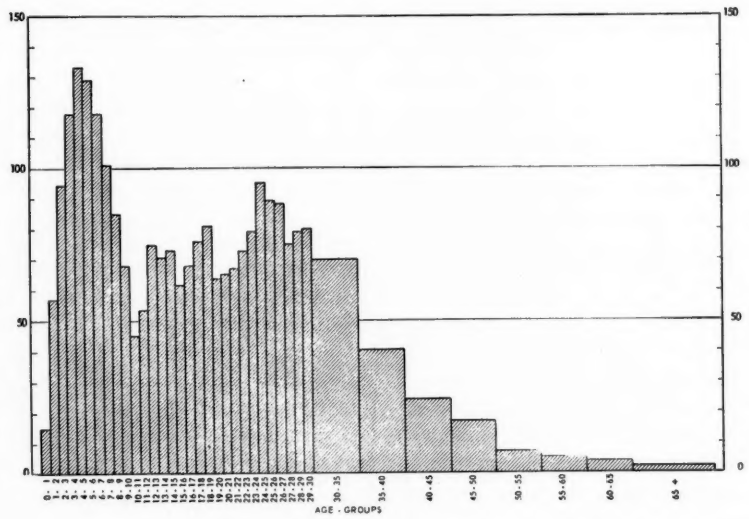


FIG. 5. NOTIFIED CASES OF POLIOMYELITIS (PARALYTIC ONLY) BY AGE-GROUP: SWEDEN, 1953 (RATES PER 100 000 INHABITANTS)



Based on data received from G. Olin (personal communication)

6 deaths. The percentage of paralytic cases was approximately the same as in recent years : 1950, 68% ; 1951, 62% ; 1952, 74% ; and 1953, 60%. Fig. 5 shows the age incidence of paralytic cases for the whole country in 1953.

In Finland the 316 cases notified in 1953 (80% of them in rural areas) represent the

TABLE I. NOTIFIED CASES OF POLIOMYELITIS, BY AGE-GROUP: DENMARK, 1950-3

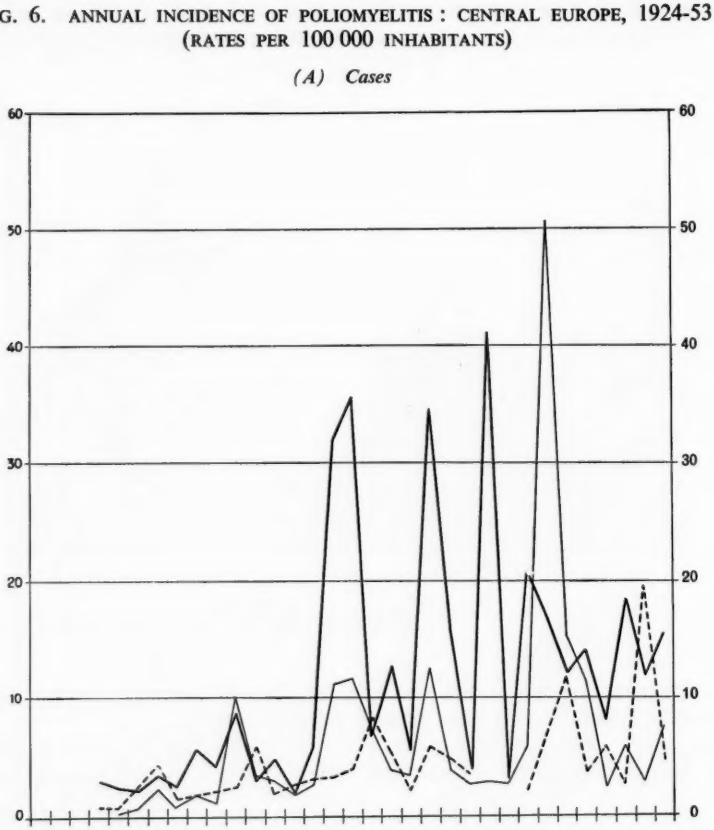
Age-groups (years)	1950 [a]		1951 [a]		1952 [b]		1953 [b]	
	no. of cases	%	no. of cases	%	no. of cases	%	no. of cases	%
under 1	52	3.3	10	2.6	165	2.9	42	2.5
1-4	451	28.7	58	15.1	1,675	29.3	410	24.2
5-14	688	43.8	195	50.9	2,264	39.6	717	42.3
15-64	379	24.1	119	31.1	1,591	27.9	523	30.8
65 and over	1	0.1	1	0.3	16	0.3	4	0.2
Total	1,571	100.0	383	100.0	5,711	100.0	1,696	100.0

[a] Final figures [b] Preliminary figures

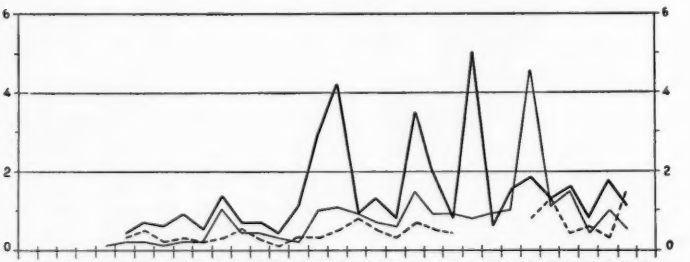
60+

FIG. 6. ANNUAL INCIDENCE OF POLIOMYELITIS : CENTRAL EUROPE, 1924-53
(RATES PER 100 000 INHABITANTS)

(A) Cases



(B) Deaths



Austria
Germany (1924-43, old " Reich " ; 1946-53, Federal Republic of Germany)
Switzerland

second highest morbidity-rate since 1946, the highest having occurred in 1950.

The 1953 epidemic in Norway seems to have been one of the most severe : there were 1095 final notifications, the highest number recorded except for 1951 (2233) and 1941.

In Denmark notifications reached a final figure of 1591—a much lower figure than that for the preceding year (5676). Distribution of notified cases by age, over the past four years, is given in table I.

It will be noted that the number of cases in the youngest age-groups tended to decrease, while the higher age-groups were more and more affected, a tendency which seems to be present in a number of countries.

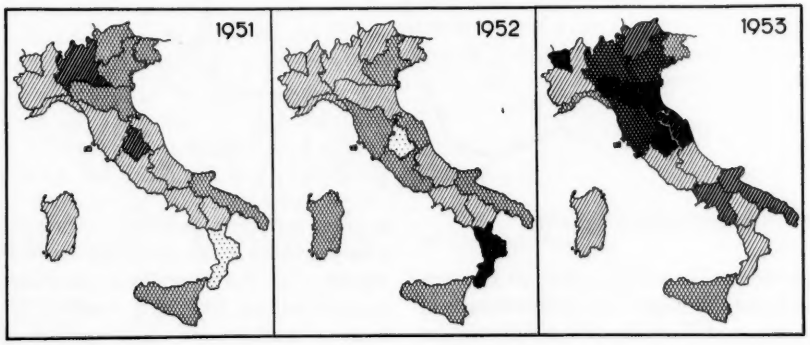
Fig. 6 shows the incidence of poliomyelitis in Austria, Germany, and Switzerland from 1924-6 to 1953. There was a marked improvement in the Federal Republic of Germany (2243 notifications in 1953 as compared with 9517 in 1952, the record year), and an increase in incidence in Austria. 1953 may be considered an epidemic year in Switzerland ; the 764 notifications represented the highest incidence during the past ten years, with the exception of 1944 (record year, with 1793 notifications), 1946, and 1951.

Morbidity-rates decreased, as compared with 1952, in Belgium, Luxembourg, Malta, the Netherlands, Portugal, Turkey, and, especially, Spain. The number of notifications increased in England and Wales, France, Greece, Italy (4995 as compared with 2708 in 1952), Scotland, Northern Ireland, the Republic of Ireland, Trieste (British/USA Zone), and, in particular, Yugoslavia (603 cases, with 25 deaths, as compared with 128 cases and 10 deaths in 1952).

Oceania

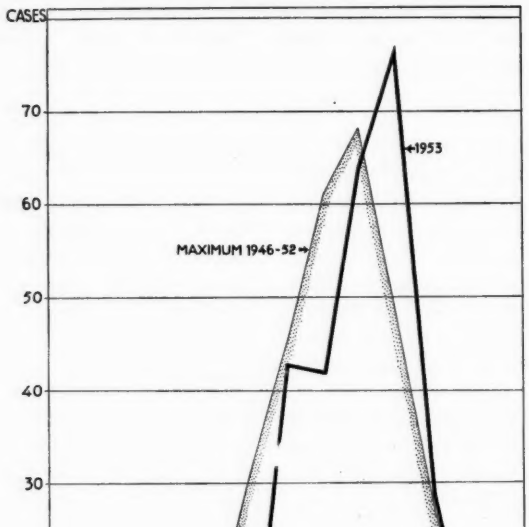
In the 19 countries or territories of Oceania for which statistics are available for the past two years, 2201 cases [2] of poliomyelitis were notified in 1953, as compared with 2961 for 1952. In the Cook Islands, Guam, Netherlands New Guinea, and New Caledonia, 27 cases were notified, whereas there were none in the previous year.

FIG. 7. DISTRIBUTION OF POLIOMYELITIS : ITALY, 1951-3



[2] Maoris excluded

FIG. 8. NOTIFIED CASES OF POLIOMYELITIS, BY FOUR-WEEK PERIOD: NORTHERN IRELAND, 1946-53



RESPONSIBLE VIRUSES

Knowledge concerning the viruses responsible for poliomyelitis in different parts of the world is still scanty. Yet information on the characteristics and behaviour of the prevalent viruses, both poliovirus and others which may cause similar clinical syndromes, is essential if immunization procedures are to give satisfactory results, since the immunity produced must be specifically effective against the prevalent infecting organisms responsible for clinical disease.

Systematic studies have been undertaken in some countries, and the resulting information has been made available to WHO by members of the Expert Advisory Panel on Virus Diseases and by a number of other leading workers on poliomyelitis. This information has been incorporated into the *Bulletin* report on poliomyelitis in 1953.

Africa

Investigations have been made in Africa on the types of poliovirus prevalent in several areas. In Johannesburg, in the summer of 1953-4, a year of average incidence there were three waves of infection : the

first, early in the season, due to type 3 ; the second, in mid-summer, due to type 2 ; and the third, in the autumn, due to type 1. In Salisbury, Southern Rhodesia, type 1 was prevalent in the summer of 1951-2, type 2 in 1952-3, and type 3 in the autumn of 1954. Nearly all the cases in an outbreak in 1954 in Port Elizabeth, Cape Province (Union of South Africa) were due to type 2 virus. A recent (1954) outbreak in Kenya was due to type 1 virus.

America

Some information on viruses from cases of poliomyelitis in Canada is available. In Toronto in 1952, 7 type 1 and 2 type 3 viruses were identified ; in Saskatoon and Vancouver in the same year, 4 type 1 viruses and 2 " orphan " [3] viruses were recovered from cases of paralytic poliomyelitis ; and in Kimberley, 3 type 3 strains were identified. In 1953, 56 type 1 poliomyelitis viruses were isolated : 13 in Manitoba, 4 in Newfoundland 1 in Nova Scotia, 33 in Ontario, and 5 in the Yukon.

An epidemic in Jamaica in 1954—the first to occur in the island—was due to type 1 virus.

More information is available for the USA than for any other country, but even here it is incomplete. Some of the data provided by individual workers in different parts of the country are summarized below.

Place	*Year*	*Poliovirus types* 1	2	3	*"Orphan" viruses*
Minneapolis	1946	7	0	0	
and the north	1948	59	0	0	
central States	1949	9	11	0	
	1950	21	1	32	
	1951	12	2	1	
	1952	77	0	8	
	1953	385	1	8	
	1954	6	2	2	
New Haven, Conn.	1952	5	8	5	
Pennsylvania					
Lock Haven	1952	46	15	0	
Easton	1950	12	1	3	
Philadelphia	1953	19	3	5	3
Pittsburgh area	1949-51	28		9	
Utah *	1951	26	3	0	2
Texas *	1952	66	13	12	11
Iowa-Nebraska *	1952	125	0	0	3
Boston, Mass.	1949	16	0	1	
	1950	6	0	25	
	1951	11	1	3	
	1952	38	11	8	
	1953	34	3	0	
Ohio	1952	33	0	0	

[3] The term " orphan " virus is used to describe the several different agents isolated from stools which cannot at present be further identified and of which the significance as causes of human morbidity is uncertain. These agents have been isolated in tissue culture, in which they cause a cytopathogenic effect. They have often been referred to by the phrase " unidentified cytopathogenic agents ".

* Information collected systematically during field trials of gamma globulin

Asia

Thirty-one strains of poliovirus have been isolated in Israel : 29 type 1, 1 type 2, and 1 type 3. Fourteen "orphan" viruses have been isolated, including 11 from paralytic cases.

A number of strains of poliovirus have been isolated in Bombay, and 5 have been typed : 4 type 1, and 1 type 2. The classification of 5 strains selected from various parts of Japan has been reported : 1 type 1, 2 type 2, and 2 type 3.

Europe

Information available from Belgium is tabulated below :

Year	*Poliovirus types* 1	2	3
1952	4	1	0
1953	3	0	1
1954 (first half)	4	0	0

In Denmark, the outbreaks in 1952 and 1953 were due to type 1 virus. Up to the present only 1 type 3 strain has been isolated in the country, and only type 1 strains in 1954. Seven strains of "orphan" virus have been isolated from clinical cases of poliomyelitis.

Information on the first 50 strains isolated and typed in France in 1952 and 1953 reveals 31 of type 1, 3 type 2, and 8 type 3.

In Germany in 1952, 3 type 1 and 1 each of types 2 and 3 were isolated. Outbreaks in Saarland in 1951 and in North Rhine-Westphalia in 1952 were due to type 1 virus.

Twenty-three strains of poliovirus were isolated in northern Italy in 1953-4 : 14 type 1, 8 type 2, and 1 type 3. In general, both types 1 and 2 were found in the same locality. Sixteen "orphan" viruses were isolated from cases diagnosed as paralytic poliomyelitis.

In the Netherlands the relatively high incidence of the disease in 1951 and 1952 was apparently associated with a predominance of type 1 strains, as was the case in the neighbouring parts of Belgium, Germany, and Luxembourg in 1952.

Attempts to isolate virus during the 1953 Stockholm epidemic gave the following results :

Clinical diagnosis	*No. of cases*	*Poliovirus type 1*	*"Orphan" viruses*
Paralytic poliomyelitis	175	127	1
Non-paralytic poliomyelitis (with meningitis)	86	61	1
Suspected poliomyelitis (without meningitis)	28	7	2

Approximately 150 more type 1 strains were isolated from this epidemic, bringing the total to about 350 strains. Types 2 and 3 were found in only one case each.

Both type 1 and type 3 virus have been incriminated in recent outbreaks of poliomyelitis in the United Kingdom. Seventy-seven strains of poliovirus have been isolated from faeces and have been typed : 38 type 1, 30 type 2, and 9 type 3—a higher proportion of type 2 than has generally been found. All strains were isolated from paralytic cases.

Oceania

In Australia, poliovirus type 1 was associated with epidemic prevalence in Victoria in 1949, 1951, and 1953-4. The epidemic in 1952-3 was caused by type 2 virus. However, all three types have been isolated throughout the period, although type 3 has been responsible for sporadic cases only.

* * *

Information concerning the types of virus responsible for outbreaks of poliomyelitis is obviously too fragmentary to justify drawing any definite conclusions. The total number of polioviruses isolated and typed from clinical cases since the different types were recognized is probably not much more than 3000 to 4000. Of the 2200 strains considered in the *Bulletin* study, 84% are type 1, 7% type 2, and 9% type 3. It is pointed out, however, that this does not represent a relative prevalence of the different types :

> " Serological studies have made it clear that all three types are widely distributed and that, as a generalization, antibodies are acquired to all three types at about the same rate. This implies that the three types are about equally common... All that can be said... is that in these selected areas [i.e., those included in the *Bulletin* article] type 1 virus has been most frequently isolated in tissue cultures, and that this type predominates in the majority of observed outbreaks, particularly in the most severe ones."

Much more research is needed on the virology of poliomyelitis. Many viruses other than poliovirus can cause the clinical picture of non-paralytic poliomyelitis; and there is evidence to suggest that there are viruses other than the three recognized types of poliovirus which can give rise to the clinical symptoms of the paralytic form of the disease.

ADVANCES IN THE MANAGEMENT OF ACUTE POLIOMYELITIS

"The transformation of the relatively uncommon 'infantile paralysis' of the 19th century into 'epidemic poliomyelitis' of almost worldwide distribution presents today one of the most formidable public-health problems." In introducing their report [1] with these words, the members of the WHO Expert Committee on Poliomyelitis summed up the gravity of the present situation.

Since 1950 WHO's active concern with the problem of poliomyelitis has been steadily increasing, as the relevant activities of the past five years bear evidence—the convening of an expert committee which, in its first report, set forth a clear and concise statement of present knowledge of poliomyelitis; the establishment of a widening network of laboratories for the study of poliomyelitis, along the same lines as the WHO network of influenza centres; the publication of a monograph [2] on the various aspects of poliomyelitis (epidemiology, virology, immunology, diagnosis, treatment, especially of bulbar and respiratory forms, and public health measures for its control), with contributions from specialists of worldwide reputation; and, finally and most recently, the organization, under the auspices of the Regional Office for Europe, of an international training course in recent techniques in the management of poliomyelitis patients, held in Copenhagen from 14 April to 5 May 1955 and attended by about forty doctors and nurses.

This course was sponsored by WHO in response to wishes expressed during the Seventh World Health Assembly : delegates from several countries requested that courses be arranged for demonstrating treatment methods for the life-threatening forms of poliomyelitis (i.e., the respiratory and bulbar forms), in particular for teaching the techniques which, applied as emergency measures by Dr H. C. A. Lassen during the Copenhagen epidemic of 1952, resulted in the saving of a considerable number of lives. It was recognized that to meet similar critical situations it is necessary to train personnel to cope with epidemics in which many patients are stricken with respiratory paralysis.

In the opinion of Dr Lassen, "optimal treatment of bulbar poliomyelitis with or without respiratory failure is one of the most complex therapeutic problems in the whole field of medicine". It is now accepted that the all-important problem in life-threatening poliomyelitis is respiratory in nature. Failing ventilation may be of spinal or bulbar origin. It may be due to the comatose state caused by polioencephalitis, or it may result from the blocking of the bronchi by secretions, from atelectasis, pneumonitis, and pulmonary oedema. Formerly the prognosis of bulbar poliomyelitis was considered very unpromising, and a certain defeatism regarding therapy prevailed. It was thought that the symptoms were due to an "overwhelming, intractable" virus infection of the medulla oblongata, pons, and midbrain. This is, in fact, true in certain cases. But the newer concept of failing ventilation due to various causes and amenable to mechanical treatment for the maintenance of an unobstructed airway has proved extremely fruitful.

Table I shows the incidence of, and mortality from, the various forms of bulbar and respiratory poliomyelitis among 345 cases treated during the Copenhagen epidemic.

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[1] *Wld Hlth Org. techn. Rep. Ser.*, 1954, 81

[2] *Poliomyelitis (World Health Organization : Monograph Series*, No. 26), Geneva, 1955

TABLE I. CLINICAL CLASSIFICATION OF BULBAR AND RESPIRATORY POLIOMYELITIS : INCIDENCE AND MORTALITY RATES IN 345 CASES

Clinical groups	Principal site of anatomical lesion	Cases		Case-mortality	
		number	per-centage	number	per-centage
A : Polioencephalitis	encephalo-bulbar	75	22	29	39
B : Pharyngeal and/or laryngeal paralysis, without encephalitis or cerebralia ; no peripheral paralysis	bulbar	12	4	3	25
C : Paralysis of spinal respiratory muscles, without encephalitis, cerebralia, or pharyngeal paralysis	spinal	157	45	48	30
D : Paralysis of spinal respiratory muscles and of pharynx or larynx, without encephalitis or cerebralia	spino-bulbar	28	8	13	46
E : Paralysis of spinal respiratory muscles, with cerebralia, but without true pharyngeal paralysis	spino-(bulbar)-cerebral	60	17	38	63
F : Paralysis of spinal respiratory muscles and of pharynx or larynx, and with cerebralia	spino-bulbar-cerebral	13	4	11	85
Totals		345	100	142	41

Outlining the different phases of this catastrophic epidemic, Dr Lassen[3] describes the tragic situation that arose when thirty to fifty patients a day, of whom six to twelve were drowning in their own secretions, poured into Blegdam Hospital, which had at the time only one iron lung and six cuirass respirators.

[3] Lassen, H. C. A. (1955) *The management of respiratory and bulbar paralysis in poliomyelitis.* In: *Poliomyelitis*, Geneva, p. 157 (*World Health Organization : Monograph Series*, No. 26)

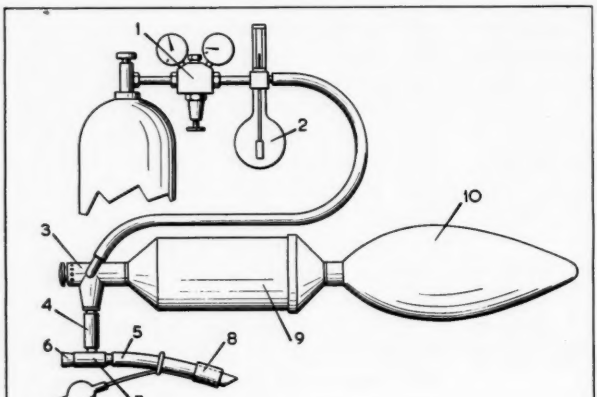

FIG. 1. EQUIPMENT FOR BAG VENTILATION WITH CO_2 ABSORBER AND RUBBER CUFF-TUBE

1. Reduction valve ; 2. humidifier ; 3. reduction valve ; 4. connexion ; 5. rubber tube ; 6. rubber stopper ; 7. connexion ; 8. cuff-tube ; 9. absorber ; 10. rubber bag

An emergency treatment was introduced, with the help of anaesthetists. This consisted of high tracheotomy with the introduction of an inflatable rubber cuff-tube to prevent air from penetrating into the hypopharynx, postural drainage, and manual ventilation and helped to reduce mortality from over 80% in August to 25% in December.

Experience has shown that tank respirators are indicated for the so-called " dry " cases, those without accumulation of secretions in the airway—i.e., for cases of pure spinal

FIG. 2. BAG VENTILATION WITH ABSORBER

with a mixture of about 50% oxygen from a rubber bag (see fig. 1 and 2). Though " neither new nor ideal ", according to Dr Lassen, this method using manual bag ventilation proved of great value since modern equipment for mechanical respiration was limited. It made possible the transport of patients to treatment centres respiratory insufficiency without bulbar involvement. On the other hand, they are contraindicated for " wet " cases, those with the airway obstructed by secretions. In the latter it is preferable to use the method outlined above : high tracheotomy, with the insertion of an inflatable cuff-tube to seal off the trachea and prevent aspiration of

secretions and gastric contents, and positive-pressure ventilation. After tracheotomy some " wet " patients immediately regain so much spontaneous respiration that further mechanical aid is unnecessary. Intratracheal positive-pressure ventilation with CO_2 absorption, manual or mechanical, for which several types of apparatus have been devised, can, if necessary, be kept up continuously for at least two years. This method also has enormous psychological advantages : the patient is not enclosed, as he is in the tank respirator ; and there is no danger of friction sores. The patient usually remains calm and confident.

Besides the demonstration of methods of treatment of bulbar and respiratory poliomyelitis, the Copenhagen course included theoretical and practical work with various types of respirators and of appliances for postural drainage and artificial ventilation. The programme also featured lectures on the physiology of respiration and on the role of the laboratory, the anaesthetist, the laryngologist, the physiotherapist, and the nurse in the treatment of life-threatening poliomyelitis.

CARDIOLIPIN ANTIGENS

The isolation of cardiolipin by Dr Mary Pangborn and her associates at the Division of Laboratories and Research of the New York State Department of Health, Albany, N.Y., marked a significant advance in the search for a chemically defined antigen which would aid in improving and standardizing serological tests for the treponematoses. WHO early became interested in cardiolipin antigens because of its role in carrying on the work begun by the Health Organisation of the League of Nations on the standardization of serological antigens and methods and because of its concern with the treponematoses and their control. Further, the New York State Department of Health, which had established a protective patent for the USA to secure the purity of cardiolipin products, suggested that the Organization should supervise the international control of cardiolipin.

During the past seven years, considerable progress has been realized in WHO's work on cardiolipin antigens : International Reference Preparations of cardiolipin and of lecithins have been established and are obtainable from the Statens Seruminstitut, Copenhagen ; a description of cardiolipin and of lecithins, together with some basic principles for the assay of their reactivity and specificity, are included in volume II of the *Pharmacopoea Internationalis* ; and, to make available technical information on the antigens, a monograph has been prepared by Dr Pangborn and her associates and has been published by the Organization.[1] This monograph contains a description of the methods for the preparation and purification of cardiolipin, beef-heart lecithin, and egg lecithin. It also gives the chemical methods to be employed for preliminary checking of the purity of preparations, as well as the final serological testing procedure which is necessary to eliminate unsatisfactory cardiolipin and lecithins.

Dr Pangborn describes cardiolipin and cardiolipin antigens thus :

" Cardiolipin is a phospholipid, containing no nitrogen, and possessing one acidic valency for each phosphorus atom. It occurs in tissue extracts in the form of neutral salts. The free-acid form is unstable.

[1] See page 184 of this number of the *Chronicle*.

Cardiolipin antigens, used in serological tests for syphilis, are mixtures of sodium cardiolipin with purified lecithin and usually also with cholesterol. The usual source of cardiolipin is beef-heart muscle, but it is to be expected that the same product could be obtained from the organs of other animals.

"Beef-heart lecithin was used in the first work on cardiolipin antigens, but egg lecithin is to be preferred because it is much more easily purified. Comparison of the two lecithins has shown that they may be used interchangeably in antigen mixtures."

Since alcoholic extracts of tissue have come into use as antigens in serological tests for syphilis, many efforts have been made to improve the sensitivity and specificity of these extracts. The work has been directed towards two ends : one, to obtain a more-purified extract by discarding the less important or even harmful fractions of the basic alcoholic extract ; and the other, to improve the reactivity of a given antigen by changing the conditions for preparing the suspension (method of dilution and its degree, temperature and time for maturation of the suspension, the concentration used for the test itself), and, for the complement-fixation tests, by the use of different types of haemolytic system. In addition, certain substances have been added to the antigen solution—e.g., cholesterol, Tolu balsam, corn sterols—to modify the reactivity of the suspension.

The purification of cardiolipin and the proof that this substance, when combined with purified lecithin and cholesterol in certain proportions, gives a valuable antigen were of the greatest importance in the progress towards good sensitivity and specificity.

Methods for the preparation of cardiolipin and purified lecithin and the chemical specification of these substances were described by Dr Pangborn during the years between 1941 and 1951. Results of the first serological studies appeared between 1944 and 1946.

Many authors have now described the different cardiolipin antigens needed for various serological tests. Most complement-fixation tests use the formula which was first given by the New York State Department of Health and afterward recommended by Kolmer as one of several possibilities : cardiolipin, 0.0175% ; lecithin, 0.0875% ; and cholesterol, 0.3000%. During the past three years other formulae have been given by laboratories in Canada, England, and Japan :

	Cardiolipin %	*Lecithin* %	*Cholesterol* %
Kolmer	0.03	0.05	0.3 up to 0.9
	0.06	0.05	0.6 up to 0.9
Allen	0.0175	0.2	0.3
Price	0.05	0.05	0.50
Ogata	0.01	0.04	0.20
Taniguchi	0.02	0.03	0.20

The dilution for preparation of suspensions of cardiolipin antigen often differs from one test to another, although a common antigen formula is used.

There are now many flocculation tests in which cardiolipin antigens are used. Each has its particular formula and its special technique for preparation of the suspension. The concentration of cardiolipin and lecithin varies a great deal, but in most cases the ratio of lecithin to cardiolipin lies between 7 and 10 to 1. For some of the tests cholesterol is part of the alcoholic solution ; for others, the alcoholic solution of cholesterol is precipitated by means of distilled water, whereafter the alcoholic solution of cardiolipin and lecithin is added, followed by specific amounts of saline. Details are given below :

Test	*Cardiolipin* %	*Lecithin* %	*Cholesterol* %
Hinton	0.15	0.75[a]	0.25[a]
Kahn	0.10	1.00	0.025
Kline	0.20	1.5 up to 2.0[b]	Separate solution of cholesterol[c]
Lorenzo	0.06	0.27	0.90
Marquez	0.02	0.14	0.90

a Subject to standardization
b Subject to standardization ; some laboratories have adopted 1.5 or 2.0 as fixed percentage
c 1 % alcohol solution

Test	*Cardiolipin* %	*Lecithin* %	*Cholesterol* %
Mazzini	0.025	0.20	0.75 up to 0.90 [a]
Meinicke	0.015	0.045	Tolu balsam, 1.025
New York State	0.03	0.30	0.90
Rappaport Stained Cardiolipin	0.20	1.30	Separate solution of cholesterol [c]
Rein-Bossak	0.20	1.30	Separate solution of cholesterol [c]
Schmid	0.0315	0.2520	0.9450
Taniguchi	0.02	0.10	Separate suspension of colloidum
VDRL	0.03	0.21 [d]	0.90

[a] Subject to standardization
[b] Subject to standardization ; some laboratories have adopted 1.5 or 2.0 as fixed percentage
[c] 1% alcohol solution
[d] Subject to standardization; some laboratories have adopted 0.21, 0.23, or 0.27 as fixed percentage

Not only has it been possible to obtain a higher sensitivity and specificity with antigens prepared from cardiolipin and lecithin than with those prepared from the old type of alcoholic extracts (lipoidal antigens), but also it is now easier to adjust an antigen to a certain level of sensitivity or specificity and to maintain for new batches a chosen level of reactivity. Some authors claim that a standard sensitivity is obtained only when preparations which have passed a certain chemical and serological test are used; others state that a certain adjustment of the lecithin percentage is necessary to maintain a standard reactivity of the antigen, even when the selected preparations of cardiolipin and lecithin are used.

The cardiolipin antigens have also made it possible for antigens for different tests to be compared on a more rational basis, since these antigens can now be made from the same batches of cardiolipin, lecithins, and cholesterol.

Of importance is the fact that cardiolipin antigens and the various lipoidal antigens react with a complex of antibodies called " reagin ", and that this reagin is not identical with the antibody or group of antibodies which react with the *Treponema pallidum* in tests such as the *Treponema pallidum* immobilisation test. Therefore, even with the best cardiolipin antigen, it is not possible to avoid reactions in some sera from persons who do not have syphilis or any other type of treponemal disease. This is because diseases or conditions other than the treponematoses may give rise to the appearance of antibodies which are more or less similar to those which make up the reagin. Nevertheless, false positive reactions in sera from cases of, for example, malaria and pneumonia are frequently avoided when cardiolipin antigens are used instead of lipoidal antigens. In sera from cases of leprosy, however, this is not so.

Serological testing of new preparations of cardiolipin and lecithins consists of a comparison of the new product with the International Reference Preparation, established by the WHO Expert Committee on Biological Standardization. To assure, for instance, that a new cardiolipin is of the same reactivity as the International Reference Preparation, which was produced in Albany and which is held by the Standards Department of the Statens Seruminstitut, Copenhagen, it is necessary to compare the reactivity of two antigens for the complement-fixation test and of two antigens for the flocculation test. Each pair of antigens contains a reference antigen and a test antigen of the following composition :

	Cardiolipin	*Lecithin*	*Cholesterol*
Reference antigen	International Reference Preparation	International Reference Preparation	pure solution
Test antigen	New preparation	International Reference Preparation	same pure solution

The antigens should give agreeing results when used for testing different reactive and non-reactive sera on several testing days. Both qualitative and quantitative testing

should be employed, and the tests used should have been studied to determine what conditions should be stipulated for acceptable agreement between the antigens. This control will enable unsatisfactory preparations to be eliminated.

Work is now in progress on the establishment of International Reference Preparations of sera from syphilitics in the form of freeze-dried sera, with a view to obtaining a common yard-stick for the comparison also of the reactivity of different serological methods. The future availability of International Reference Preparations both for the major components of cardiolipin antigens and for sera from syphilitics is expected to provide a more uniform, stable, and comparative basis for serological testing for syphilis and other treponematoses in laboratories in all parts of the world.

THE 1954/55 INFLUENZA EPIDEMIC IN THE NORTHERN HEMISPHERE

Epidemiological information concerning the influenza epidemic of late 1954 and early 1955 has appeared regularly in the WHO *Weekly Epidemiological Record.* While it is still too soon to be able to present a complete picture, some idea of the nature and extent of this epidemic can be obtained from information assembled from the *Record* and from other data made available to WHO. It is from these sources that the following description of the outbreaks in various countries has been drawn.

The first epidemics in the Northern Hemisphere were reported in Wales and the north-east of England in October 1954. These original outbreaks affected schools and other communities in particular. At the end of the year and in January 1955, incidence increased among adults, and the infection spread to most parts of the country. It receded in February. It was found that virus B was largely responsible, although a few cases of influenza A were diagnosed in South Wales, the Midlands, and London.

Towards the middle of December 1954, a number of cases were reported in Slovenia, but it was not until January 1955 that outbreaks, affecting communities especially, were noted in other parts of Yugoslavia. The presence of influenza B was confirmed serologically. During the last week of February, incidence increased in Zagreb; and, in the first week of March, it also rose in Serbia, particularly in Belgrade.

At the beginning of January 1955, Canada reported the beginning of an epidemic, involving several hundred cases, in the area around Calgary, Alberta. Virus B was identified. In the last week of the month, the disease abated in this sector, but an outbreak was noted in Ontario. This latter outbreak receded at the beginning of February, while a new focus appeared in Nelson, British Columbia.

About 7 January, the Netherlands were affected, with an outbreak in Den Helder (northern Holland). By the middle of February influenza had spread throughout the rest of the country, especially among children. There were a few deaths, attributed to secondary staphylococcus pneumonia. The presence of type B virus was confirmed by virological and serological tests on sample cases from several provinces.

In the second half of January there was an increase in cases of rhinopharyngitis in the

Federal Republic of Germany, especially in the Bremen-Hamburg-Lübeck area and mainly among children and young adults. The infection remained mild until the beginning February. An epidemic also developed in Hesse, particularly in the Frankfurt-Hochst region (from the middle of January) and at Wiesbaden (at the end of the month). The infection proved to be very contagious and affected 30% to 40% of schoolchildren in towns and more than 50% in rural areas. At the end of January, nearly 10% of the adults were also affected. From 16 to 22 January, notifications increased in the south, in Lower Franconia (Bavaria). During the first week of February, the epidemic spread to the Rhine area (except, apparently for the left bank), the region of the Main, Schleswig-Holstein, and Bavaria (Franconia), where the main focus seemed to be located. In the second half of February, the infection receded in the north (Lower Saxony, North Rhine, Westphalia), after having affected nearly 15% of the population. At the beginning of March, the situation improved in Hesse, while morbidity continued to increase in the south-east (Swabia, Upper and Lower Bavaria). During these epidemics the presence of virus B was demonstrated by the complement-fixation and Hirst methods. Virus A was also demonstrated in certain cases in the central and northern parts of the country.

Also in the second half of January, a focus of influenza infection appeared in Helsinki (Finland), mainly affecting children. Among 20 000 schoolchildren under observation, the absence rates for the weeks ending 22 January, 29 January, and 5 February rose successively from a normal level of 4.5% to 4.8%, 19.5%, and 25.4%. A strain of influenza virus was isolated which was serologically related to the B strains isolated in England.

During the same period a relatively mild epidemic of influenza B was reported in Japan among primary schoolchildren of the prefectures of Chiba and Yamanashi (Honshu Island). At the beginning of February, the disease spread to the primary schools of Tokyo and to several other prefectures of Honshu.

In the USA, absences among the schoolchildren of Portland and the County of Multnomah, Oregon, increased from the beginning of February because of an unusual prevalence of respiratory infections. Reports received in mid-February indicated a large number of cases of influenza-like infections in Syracuse, New York, and in Maine.

In Austria, notifications of cases of influenza increased rapidly from the first week of February and began to fall off in the second week of March in the greater part of the country, with the exception of the north-east (Upper and Lower Austria and the region of Vienna).

Also during the first week of February, influenza morbidity increased in Oslo, Sweden, and Switzerland. These outbreaks reached their maximum during the week ending 19 March.

Finally, at the end of February, outbreaks affecting principally children and young adults and reaching their peak in the first week of March began to appear in the centre and north of Sweden (districts of Örebro and Boden).

In summary, the influenza epidemic of 1954/55 was mild, causing relatively few deaths, and was similar to previous epidemics, which seem to have followed each other at intervals of two or three years since the great pandemic of 1918.

Reports of Expert Groups

LEGISLATION AFFECTING PSYCHIATRIC TREATMENT

Legislation concerning the mentally ill has not kept pace with advances in therapy. Although the concept of alienism, of shutting the mental patient up in an asylum, is gradually being replaced by that of illness, with emphasis on treatment in psychiatric hospitals or by means of out-patient services, present legislation still tends to give more weight to legal than to medical considerations. Too seldom does it fulfil its true functions of enabling treatment and care to be given and, at the same time, of protecting the patient and society. Both admission to, and discharge from, a mental hospital are often rendered difficult; and, in its concern for protecting society, legislation commonly fails to give due consideration to the liberty of the individual patient. Mental health legislation should be a help rather than an obstacle to psychiatric care; its aim should be to foster public responsibility for providing care for the mentally ill rather than to place checks on the mental patient and his physician.

The problem of what mental health legislation is and should be is the subject of the fourth report of the WHO Expert Committee on Mental Health.[1] In preparation for the committee's discussions, an extensive study of existing legislation was made.[2]

Essential requirements to be met

A primary requisite of legislation affecting psychiatric treatment is that it encourage the provision of treatment facilities without hampering progress in treatment and care. It is not enough to have psychiatric hospitals; there must also be some assurance that they be properly staffed and run. The report specifies, therefore, that the law should provide for the recruitment and training of specialized professional staff. Other essentials are the setting-up of a specialized health service—i.e., a community psychiatric service—and the institution of measures permitting treatment of patients who are unaware of their condition, or who are dangerous, and ensuring guardianship and medical supervision when the patient's condition requires them.

The problem of the unwilling patient

Considerable space is devoted in the report to the problem of the unwilling patient, since this is one of the chief points with which legislation concerning the mentally ill usually deals. It is emphasized that the better psychiatric services are, the less need will there be for powers to compel patients to accept treatment.

The report describes the problem from the viewpoints of those concerned with compulsory treatment:

> " To the physician the admission to hospital of a mental patient whose condition prevents his appreciating his need for treatment is a medical matter, akin in some ways to an emergency surgical operation and in others to the isolation, in the interests of his fellows, of a patient suffering from an infectious disease.
>
> " To the jurist, it is a matter of individual liberty and of the safeguards which the law must provide to protect it.
>
> " To the citizen, both these aspects are important."

Any law which deals with this subject should therefore attempt to recognize the needs of both medical treatment and legal safeguards.

[1] *Wld Hlth Org. techn. Rep. Ser.*, 1955, **98**, 25 pages. Price: 1/9, $0.30, or Sw. fr. 1.—. Published in English, French, and Spanish.

[2] See page 180 of this number of the *Chronicle*. The information in this study is based in part on data assembled for the Expert Committee meeting.

Much existing legislation involves a judicial pronouncement for admission to a mental hospital, but this creates a type of stigma which would better be avoided. A recent tendency is to permit compulsory admission on the joint request of a psychiatrist and a relative of the patient, or some specified non-judicial authority, subject to judicial review after admission. Such a procedure may allow compulsory treatment for a period of 12 to 18 months and ensure that the majority of patients who recover under treatment will do so without having been detained in hospital by judicial order.

A means should be provided for a patient to appeal his case at any time after his involuntary admission. In most countries such an appeal would be to a judicial authority, but it is beginning to be recognized that another type of "judging" body might be preferable, such as a board composed of a physician, a judge, and a layman. The purpose of any body authorizing compulsory detention should be restricted to deciding on the legality of the detention and should not be concerned with certifying that a patient is insane or mentally subnormal.

The report points out that methods of discharge are particularly important as a safeguard against wrongful detention in a psychiatric hospital, and that the power of discharge may rightfully rest with the patient's next of kin (subject to veto by the medical superintendent of the hospital), with the hospital superintendent, or with a health authority, local or central. Every effort should be made to eliminate the fear on the part of the public that once admitted to a mental hospital it is difficult to get out, since such a fear makes people unwilling to seek treatment at an early stage of mental illness.

There are patients who, in their own interest and that of their relatives, need some form of compulsory supervision as part of treatment outside hospital. At present there is no psychiatric legislation providing for such compulsory supervision, although a draft law containing a proposal of this type is under discussion in one country. It is recognized that "medico-social guardianship" such as this would be possible only where well-developed extramural psychiatric services are available; but it is recommended that this idea be considered by governments intending to institute or revise legislation concerning the mentally ill.

Organization of the psychiatric service

The report suggests how the various levels of a psychiatric service should be organized, from the central authority to the local authority. The functions and responsibilities of these authorities are outlined.

Other problems

Brief consideration is given to the problems presented by certain categories of patients.

The mentally subnormal: General legislation governing the protection and education of children should meet the needs of mentally subnormal children as well. Mentally subnormal adults should be dealt with wherever possible on a voluntary basis. For neither is special legislation required.

Epileptics: No special legislation seems necessary if there is general legislation entitling all individuals to education and to working conditions suited to their abilities.

Alcoholics: There should be legislation which would make it possible for alcoholics who are dangerous to themselves or others to be obliged to submit themselves for treatment.

Legislative principles in relation to social structure

The report points out that the fundamental problems of psychiatric treatment and mental health are the same in all countries, whatever their structure or degree of economic development, but that the way in which these problems are dealt with must vary according to the type of social structure. The situation is summarized thus:

"... the problems raised by the treatment and care of mental patients are relatively simple. What is

required is to give these patients facilities for treatment and the possibility of guardianship and medical supervision in accordance with their medical needs and social inadequacy. The different methods of solving these problems are extremely complex since they must vary according to the social structure of each country... It would seem... that preference should be given above all to establishing laws strongly integrated into cultural traditions while at the same time leaving the way open for possible changes."

ALCOHOL AND ALCOHOLISM

While the attention that WHO has drawn to alcoholism as a public health problem has given the needed incentive to action in a number of countries, there is still a tendency, in many countries, to deal with alcoholism on the social welfare level rather than within the framework of public health. Better comprehension of the physical and psychological nature of alcoholism, precise definition of terms, and study of the drinking patterns in different countries are required if the problem is to be fully accepted as a matter of medical concern and to be dealt with effectively.

The report [1] of a WHO expert committee drawn from the Expert Advisory Panels on Mental Health and on Drugs Liable to Produce Addiction attempts to clarify basic ideas about the problems of alcohol through an exchange of knowledge and experience among psychiatrists, physiologists, and pharmacologists. It also contains interesting observations on variations in drinking habits and the resulting differences in alcoholic behaviour.

" Craving " for alcohol

" Craving " and alternative terms such as " irresistible desire " or " need " have been used to explain drinking arising from a psychological need, the physical need to relieve withdrawal symptoms (see below), or a physical need which originates in physiopathological conditions involving the metabolism, endocrine functions, etc., and existing in the drinker before he starts on his " drinking career " or developing in the course of it. However, there seem to be different mechanisms involved in different types of abnormal drinking, and more precise terminology is desirable. It is suggested in the report that the condition which arises when a drinker, at the termination of a drinking bout, seeks to relieve withdrawal symptoms by the use of more alcohol be referred to as a " physical dependence " on alcohol. On the other hand, the mechanism which leads to a new bout after days or weeks of abstinence results from an accumulation of psychological tensions and may be referred to as " psychological dependence ".

In all alcoholics, regardless of the reason for their alcoholism, there is a " weakening of that part of the higher personality from which the inhibition of primitive tendencies derives ", and " the pathological desire for alcohol . . . becomes more evident as the inhibiting forces weaken and ultimately fail ".

Withdrawal symptoms

The symptoms which appear after cessation of drinking or after an abrupt decrease in the rate of intake of alcohol are referred to as " withdrawal symptoms ". The kind and intensity of such symptoms seem to vary with the individual and to be correlated with the degree of intoxication and with the length of time over which this degree of intoxication has been maintained before cessation, or reduction, of the alcohol intake.

These symptoms may include—after comparatively short periods of continuous heavy drinking—tremor, weakness, perspiration, hyper-reflexia, insomnia, anorexia, nausea, vomiting, diarrhoea, slight hypertension with postural hypotension, and slight elevation

[1] *Wld Hlth Org. techn. Rep. Ser.*, 1955, **94**, 14 pages. Price : 1/9, $0.30, or Sw. fr. 1.—. Published in English, French, and Spanish.

of body temperature. Such symptoms usually last for only 24 to 72 hours. After a prolonged period of very heavy drinking (more than 30 days of continuous intoxication with amounts of alcohol sufficient to induce definite motor incoordination), withdrawal symptoms include the above in a more severe degree and, in some drinkers, convulsions and mental disturbances ranging from hallucinations without loss of insight to typical delirium tremens.

Convulsions and delirium should be prevented or treated by appropriate means, such as the administration of sedatives with gradual reduction of the amount over a period of days. Other disturbances such as nutritional deficiencies and water and electrolyte imbalance also require proper treatment.

" Inability to stop drinking " and " loss of control "

Distinction is made in the report between " inability to stop drinking " and " loss of control ". The former refers particularly to drinkers in " wine-drinking " countries and and in some of the " beer-drinking " countries who " reach a stage at which they cannot withstand any ... periods of abstinence... but do not lose the ability to regulate their alcoholic intake ". Such behaviour may be attributed to either physical or psychological dependence, or both. " Loss of control " seems to be a more appropriate expression for a different manifestation of alcoholic behaviour, common in countries where alcoholic beverages are used predominantly in the form of distilled spirits and where drinking bouts commonly result in severe intoxication, with the drinker " losing control " once drinking has started and being impelled to continue drinking on increasingly higher levels until stopped by external or internal factors. Such drinkers may, however, be able to refrain from drinking for weeks, or even months.

Alcoholic amnesias (" blackouts ")

Two types of amnesia may be associated with the ingestion of alcohol. The first may occur as one of the ordinary symptoms of severe alcoholic intoxication; the second is a type which is observed in many countries among drinkers who have ingested relatively small amounts of alcohol and which cannot be accounted for by the pharmacological action of alcohol *per se*. The latter type, sometimes referred to as " palimpsests ", is reported with high frequency in the early stages of alcoholism in the USA, the Scandinavian countries, the Netherlands, and the United Kingdom, but seems to be somewhat rare in France and other viticultural countries except in association with the very late stages of alcoholism.

The reported geographical distribution of amnesic episodes suggests a possible explanation for them: it would seem that, where the consumption of alcoholic beverages is well spread over the day and is taken in the form of wine or beer, amnesic episodes are not liable to appear at the early stages of alcoholism, even if the daily total alcohol intake is high; but, where distilled spirits are the common drink and the drinking of them is concentrated chiefly at certain times of the day, the resulting quick changes in the blood-alcohol level may precipitate the amnesia symptoms. A thorough study of early amnesic episodes is needed, however, before any conclusions can be drawn.

The position of alcohol in relation to drug addiction

It has been agreed that alcohol, as a drug, should be considered as intermediate between addiction-producing and habit-forming drugs. There are certain similarities between alcoholism and opiate addiction, but important differences are also apparent. The severe withdrawal symptoms associated with alcoholism (e.g., convulsions or delirium) can be more dangerous to the life of the individual than any of the manifestations of withdrawal of morphine, for example. On the other hand, physical dependence on alcohol, as manifested by withdrawal symptoms, occurs after a longer period of " ingestion " than is the case with dependence on morphine, which can appear after administration of therapeutic doses over a period of 21 to 30 days.

Another difference is in the comparative success of treatment. Although treatment of alcoholics may not achieve satisfactory and lasting results in every case, the proportion of satisfactory results is much greater than among opiate addicts.

Still another difference between alcoholism and opiate addiction is the social attitude towards the two: alcoholic drinks are widely sold and consumed in public, and their use is generally considered normal and is even sometimes encouraged, whereas the sale of opiates is controlled or clandestine, their administration is usually by injection, their use always concealed, and the condemnation of society much greater than with regard to alcoholic excesses.

Disorders induced by alcohol

The report closes with a classification of disorders induced by the heavy use of alcoholic beverages and a discussion of the public health implications of these disorders. Alcoholism, it is emphasized, calls for " widespread action on the part of health authorities ", with particular stress laid on the establishment of out-patient services for early treatment and due attention being given to appropriate legal and social measures.

MIDWIFERY TRAINING

Variations in culture and in economic and social conditions give rise to corresponding variations in practices relating to pregnancy, childbirth, and the newborn. Today efforts are being made, in many parts of the world, to improve maternal and child health services without abruptly disturbing the patterns set by traditional beliefs and practices. Changes are being brought about gradually, through health education and the incorporation of maternity care into general health programmes.

A specific aspect of the improvement of services for pregnant women and for the newborn is the training of midwives, and this is the subject of the report of a WHO expert committee.[1]

The report first describes the types and functions of midwifery personnel (apart from physicians), classified into three broad groups: (1) traditional birth attendants, who are still common in economically less-developed areas ; (2) auxiliary midwives, who have some training for their work ; and (3) fully trained midwives, including the trained midwife, the nurse midwife, and the public-health nurse midwife.

The level of the training which can be given must be adapted to the general education of the midwife recruit as well as to local conditions, with the training programme developing towards a higher professional standard. For example, plans for areas where the numbers of trained personnel are limited and the service is dependent on the traditional birth attendant should aim to improve the practice of the latter, to prepare qualified midwives for training and supervising auxiliary midwives, and to train auxiliary midwives.

A large section of the report is devoted to the preparation of the fully trained midwife and of the auxiliary midwife. The essential knowledge and skills are outlined, factors to be considered in the selection of students are suggested, and the desirable training facilities and appropriate methods of teaching are described. It is specified that the student midwife should have experience, under supervision, in the complete maternity care (pre-natal, delivery, and post-natal) of a minimum of twenty cases. The training of the midwife teacher is also discussed.

Attention is then turned to the traditional birth attendant, whose influence in the community may be great and whose role important, but whose training in technical

[1] *Wld Hlth Org. techn. Rep. Ser.*, 1955, 93. 21 pages. Price : 1/9, $0.30, or Sw. fr. 1.—. Published in English, French, and Spanish.

matters may present difficulties because of her lack of schooling. Simpler teaching methods have to be used ; the most effective type of teaching is probably well-supervised, in-service training, given by a qualified midwife.

Since the quality of midwifery practice is an important factor in the success of health services—of maternity care programmes, in particular— regulation by law of midwifery training and practice is recommended. Such legislation, designed to protect the patient (mother and newborn) and the attendant, should provide for maintenance of adequate standards of training and examination, regulation and supervision of practice, and protection of the title and status of the midwife.

The report stresses that no general programme for training midwives can be specified : each country must plan and develop a programme to meet its own needs, taking into account local conditions and the type of personnel to be trained.

BIOLOGICAL STANDARDIZATION

The eighth report of the Expert Committee on Biological Standardization [1] records the establishment of International Standards and Reference Preparations for a number of substances: Schick Test Toxin (Diphtheria); *Clostridium welchii (perfringens)* Antitoxins, Type B and Type D; Swine Erysipelas Serum, Anti-N; Purified Protein Derivative of Avian Tuberculin; Thyrotrophin; Protamine; and the melaminyl trypanocides Mel B and MSb. International Unitages were assigned by the Committee to some of these newly established standards and reference preparations and also to the International Standard for Anti-Q-Fever Serum, which was established last year.

[1] *Wld Hlth Org. techn. Rep. Ser.*, 1955, **96**. 19 pages. Price: 1/9, $0.30, or Sw. fr. 1.—. Published in English, French, and Spanish.

Health Legislation

COMPARATIVE STUDY: THE HOSPITALIZATION OF MENTAL PATIENTS

The laws and regulations governing the hospitalization of the mentally ill vary from country to country. Most existing legislation, however, is still inspired by the principles that underlay laws enacted, in many instances, more than a hundred years ago. A certain number of countries have recently established commissions or committees to examine and revise their national legislation in the light of modern psychiatric knowledge. The fourth session of the WHO Expert Committee on Mental Health, held in Geneva from 1 to 6 November 1954, was devoted to an examination of the principles that should govern legislation affecting psychiatric treatment.[1] Thus a survey of the admission procedures in use in various countries is topical; such a survey, covering the mental health legislation at present in force in more than thirty countries, has just

[1] See page 175 of this number of the *Chronicle*.

been published in the *International Digest of Health Legislation.*[2]

It is now generally agreed that the aim of mental health legislation should be to provide facilities for early treatment and to make provision for the hospitalization of the mentally ill by procedures which are neither humiliating nor complicated yet which afford adequate safeguards against arbitrary detention. The principles underlying laws governing the admission of the mentally ill to hospital, many of which are based on the French law of 1838 and the English act of 1890, may be summarized as follows: whereas under the French law a mental patient might be admitted to hospital on medical certification or by administrative order, the English law permitted admission only by order of a judicial authority. One or the other of these two systems has been adopted by, and forms the basis of, the legislation of many countries.

At a later date, in some countries very recently, procedures for facilitating the admission of mental patients to hospital were introduced. The most radical innovation is voluntary admission, which enables a patient to obtain early treatment without the stigma of certification and, as he may usually leave the hospital at will, affords him adequate protection against arbitrary detention. Provision is also made in certain countries of the British Commonwealth for temporary treatment without certification, that is, admission without the intervention of the judicial authorities. Special procedures for emergency admission and for admission for observation exist in most countries.

The admission procedures in use in the countries studied are examined in this survey under the headings voluntary admission; involuntary admission (admission on medical certification, admission on judicial order, admission on administrative order); emergency admission; and admission for observation.

The hospitalization of special categories of mental patients, such as mental defectives, epileptics, drug addicts and alcoholics, offenders and prisoners, and sexual psychopaths, for whom provision is also made in certain countries, is dealt with in the second half of the survey. Certain of these categories pose very complicated problems. For example, the classes of persons included in the category of mental defectives vary markedly from country to country; and the nature of the mental disorder from which they suffer is such that the legal provisions applying to them are to be found not only in mental health legislation, but also in enactments relating to education, penal codes, etc.

Then follow sections dealing with family care and with trial leave, the latter often taking the form of boarding-out with a selected family. These arrangements, which apply both to the mentally ill and the mentally defective, are of help in assisting patients to re-adapt themselves to community life.

Arbitrary detention and refusal to release, which have long been a recurrent theme in the more sensational type of literature, are dealt with in a further section devoted to safeguards. Although a formal admission procedure may be considered *per se* a means of ensuring that patients are not arbitrarily committed to, or detained in, mental hospitals, most law-makers have provided additional safeguards by including provisions enabling a patient or his relatives or the authorities which ordered admission to apply for discharge at any time, requiring superintendents of mental hospitals to notify the judicial or administrative authorities of every admission and to send reports on each patient at regular intervals during his stay in the hospital, and prescribing the inspection of mental hospitals by certain designated authorities. An appeal against refusal to release may also be made in most countries.

The final section of the survey deals with tendencies in draft laws and regulations. Six tables containing an outline of the main provisions governing the hospitalization of the mentally ill in the countries studied are included in an appendix.

[2] *Int. Dig. Hlth Legis.*, 1955, **6**, 1-100. This study is also available as a pamphlet (Price: 6/9, $1.25, or Sw. fr. 4.—). Published in English and in French.

Notes and News

Seminars on the Teaching of Preventive Medicine

The Pan American Sanitary Bureau, which acts as WHO Regional Office for the Americas, is organizing two seminars on the teaching of preventive medicine. All the 75 medical schools in Latin America are expected to participate in these seminars. The first, planned for autumn 1955, will include medical school deans and professors from Argentina, Bolivia, Brazil, Chile, Paraguay, Peru, Uruguay, and Venezuela. The second, to be held early in 1956, will include representatives from Colombia, Cuba, Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Mexico, Nicaragua, and Panama.

The general purpose of the seminars is to promote the interchange of ideas and experience among deans and professors of preventive medicine in the training of doctors. The subjects to be discussed are (1) programme and methods of teaching preventive medicine; (2) organization of the department of preventive medicine, and the formation and functions of the faculty; (3) relationships with other departments of the school of medicine; and (4) the role of the department of preventive medicine in the activities of public health services, and vice versa.

Two special consultants are working with regular staff members of the Bureau on the preparation of the seminars, in which they will also participate—Dr Abraham Horwitz, Sub-director of the National Health Service of Chile and Director, on leave of absence, of the School of Public Health of the University of Chile; and Dr Guillermo Arbona, Professor and Head of the Department of Preventive Medicine at the University of San Juan, Puerto Rico.

Training Course for Public Health Officers and Veterinarians

The third group-training course for public health officers and veterinarians from Denmark, Finland, Iceland, Norway, and Sweden will be given from 1 August to 30 September 1955 in Göteborg, Sweden. WHO furnishes lecturers and fellowships for these courses, which began in 1953.

Among the subjects taught this year will be physiological hygiene, nutrition, occupational health, and accident prevention.

Public Health Course in Turkey

For the third year in succession, WHO is providing assistance for the Public Health Training Course held at the School of Public Health in Ankara. The course is intended for Turkish provincial and district health officers, and will be taking place this year from 1 August to 1 November. WHO provides the services of foreign lecturers in various subjects: epidemiology, parasitology, environmental sanitation, health education, hospital administration, and preventive medicine.

Meeting on Veterinary Public Health

From 6 to 10 June 1955, the Regional Office for Europe convened in Geneva an Advisory Group on Veterinary Public Health. The purposes of the meeting were to advise the Regional Office on its future programme in veterinary public health, to examine a number of current problems in Europe (particularly those relating to rabies, brucellosis, bovine tuberculosis, and hydatidosis), and to consider possible revision of the list of more

than eighty zoonoses established by the Joint WHO/FAO Expert Group on Zoonoses in 1950.[1] Thirteen medical and veterinary experts attended the meeting, of which Professor A. Stampar (Zagreb) was Chairman.

Inauguration of United Kingdom Committee for WHO

The United Kingdom Committee for the World Health Organization held its inaugural public meeting at the London School of Hygiene and Tropical Medicine on 5 April 1955. This committee, following the pattern of similar groups in some other countries,[2] has been established to inform the general public about WHO. Its acting executive secretary is Miss Olive Baggallay, former Chief of the Nursing Section at WHO Headquarters.

Sir Allen Daley, chairman of the provisional committee, opened the meeting. An address was given by Miss Patricia Hornsby-Smith, M.P., who, speaking on behalf of the Minister of Health, noted Great Britain's support of the World Health Organization and reviewed the Organization's work. Other speakers were Professor J. M. Mackintosh, who also described WHO's activities and contributions to health in all parts of the world, and Professor G. Macdonald, who dealt particularly with the role played by the Organization in improving health in the tropics.

Post-Graduate Course in Occupational Health

A post-graduate course in occupational health was given from 9 to 28 May, under the auspices of the Ministère de la Santé publique et de la Population and the Ministère du Travail of France, at the Ecole nationale de Santé publique in Paris. The Institut de Médecine du Travail of the University of Paris, the ILO, and WHO all collaborated in this course. The participants, numbering thirty, were all physicians engaged in occupational health work; about half of them were holders of WHO fellowships and came from countries other than France. Three of the lecturers were provided by WHO. The course, the first of its kind, included visits to factories and other institutions.

Non-Proprietary Names for Addiction-Producing Drugs

In a circular letter to Member States, the Director-General has proposed that governments take steps to facilitate the establishment of non-proprietary names for addiction-producing drugs. Specifically, he has suggested that, at the same time as it transmits a notification under the international Narcotics Conventions to the Secretary-General of the United Nations, a government should also send to the Director-General of the World Health Organization information concerning such a notification, together with suggested international non-proprietary names for the substance or substances in question.

This proposal arose from a resolution of the Economic and Social Council, at its eighteenth session, to the effect that it would be highly desirable, in the interests of ensuring effective narcotics control, for the existing slow process for the establishment of international non-proprietary names for newly developed narcotics to be simplified and speeded up as much as possible. Acting on this resolution, the WHO Expert Committee on Drugs Liable to Produce Addiction, in its fifth report, set forth the proposal which the Director-General has now transmitted to Member States.

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[1] See *Wld Hlth Org. techn. Rep. Ser.*, 1951, **40**, Annex 1.

[2] See, for example, *Chron. Wld. Hlth Org.*, 1954, **8**, 304.

Review of WHO Publications

Cardiolipin Antigens : Preparation and Chemical and Serological Control. By Mary C. Pangborn, J. O. Almeida, F. Maltaner, A. M. Silverstein & W. R. Thompson. Geneva, 1955. (*World Health Organization: Monograph Series*, No. 6, second edition) 52 pages. Price : 6/9, $1.25, or Sw. fr. 4.—

This, the second edition of a monograph originally prepared for WHO in 1951 by the Division of Laboratories and Research, New York State Department of Health, Albany, N.Y., brings up to date information on the preparation and control of antigens which have done much to improve the sensitivity and specificity of serological tests for the treponematoses. The publication of this revised edition has been necessitated by important developments which have taken place since the monograph originally appeared : technical progress has been realized in the purification of cardiolipin, and a simplified method for complement fixation and for calculation of the 50% units has been evolved. In addition, it has been found desirable to clarify the text at several points and to omit the New York State Department of Health Microscopic Slide Test, which is no longer being recommended for use in the assay of new lots of antigen components.

Material for this revised edition has been compiled and prepared by three of the original authors, Mary C. Pangborn, F. Maltaner, and W. R. Thompson, in cooperation with J. O. Almeida and A. M. Silverstein, all of the Division of Laboratories and Research of the New York State Department of Health.

The first two chapters, written by Dr Pangborn, cover in detail the methods of preparing the antigens (including the preliminary extraction of cardiolipin and lecithin from beef-heart, the purification of cardiolipin, and the purification of lecithin, from both fresh eggs and beef-heart) and the chemical analysis of the components of the antigens. The last chapter, prepared by the other four authors, deals with the serological examination of cardiolipin antigens, giving specific directions for determining the optimal proportions in which cardiolipin, lecithin, and cholesterol must be mixed to give acceptable sensitivity and specificity in particular serodiagnostic tests. The changes in procedures in this new edition are, according to the authors, " aimed primarily at simplification of the actual performance of the tests and of the evaluation of results, rather than at any important alteration in the results that would be obtained or in consequent decisions to accept or to reject an antigen component in question ".

An annex, by W. R. Thompson, on direct-probability sequential analysis, and a bibliography complete the monograph.

Statistical Information

A recent number of the *Epidemiological and Vital Statistics Report* (1955, vol. 8, No. 4) contains tables on mortality from Hodgkin's disease and from leukaemia and aleukaemia, giving the number of deaths in certain countries from the beginning of the century, a breakdown by sex and age of the data for certain countries for the years 1949-53 (depending on the country), and the mean annual mortality-rates, by sex and age-group, per 100 000 of the population in certain countries for 1950-2.

Also included in this number are statistics on cases of, and deaths from, various forms of dysentery (bacillary and amoebic) in a number of countries for the period 1946-54.

International Non-Proprietary Names

In accordance with paragraph 7 of the Procedure for the Selection of Recommended International Non-Proprietary Names for Pharmaceutical Preparations,[1] notice is hereby given that the following are selected as recommended international non-proprietary names.

The inclusion of a name in this list does not imply any recommendation for the use of the substance in medicine or pharmacy.

RECOMMENDED INTERNATIONAL NON-PROPRIETARY NAMES (*Rec. I.N.N.*): LIST 1

Recommended International Non-Proprietary Name (Latin, English)	*Chemical Name or Description*
acebrocholum acebrochol	acetodibromodihydrocholesterol
acetaminosalolum acetaminosalol	acetyl-4-aminophenyl salicylate
acidum aminoaceticum amino-acetic acid	amino-acetic acid, glycocoll
acidum dehydrocholicum dehydrocholic acid	
acidum gentisicum gentisic acid	5-hydroxysalicylic acid
acidum glutamicum glutamic acid	glutamic acid
acidum iopanoicum iopanoic acid	3-(3-amino-2, 4, 6-triiodophenyl)-2-ethylpropanoic acid
acriflavinii chloridum acriflavinium chloride	mixture of the hydrochlorides of 3,6-diamino-10-methylacridinium chloride and 3,6-diamino-acridine
aethacridinum ethacridine	2-ethoxy-6,9-diaminoacridine
aethinyloestradiolum ethinyloestradiol	17-ethinyl-3,17-dihydroxy-Δ-1,3,5-oestratriene
aethoxazorutosidum ethoxazorutoside	monomorpholylethylrutoside
alcoholum benzylicum benzyl alcohol	phenylcarbinol
aldesulfonum natricum aldesulfone sodium	disodium salt of 4,4′- diaminodiphenylsulfone formaldehydesulfoxylic acid
allobarbitalum allobarbital	5,5-diallylbarbituric acid
allocupreidum natricum allocupreide sodium	sodium cuproallylthioureidobenzoate
allomethadionum allomethadione	3-allyl-5-methyloxazolidine-2,4-dione

[1] See *Off. Rec. Wld Hlth Org.*, 1955, **60**, 55.

Recommended International Non-Proprietary Name (Latin, English)	*Chemical Name or Description*
aminoaethylis nitras aminoethyl nitrate	nitrate ester of aminoethanol
aminothiazolum aminothiazole	
amodiaquini hydrochloridum amodiaquine hydrochloride	7-chloro-4-(3′-diethylaminomethyl-4′-hydroxyanilino) quinoline dihydrochloride dihydrate
antazolini hydrochloridum antazoline hydrochloride	2-N-benzylanilinomethylimidazoline hydrochloride
aprobarbitalum aprobarbital	allyl*iso*propylbarbituric acid
aurothioglycanidum aurothioglycanide	auromercaptoacetanilide
azamethonii bromidum azamethonium bromide	3-methyl-3-azapentane-1,5-bis (ethyl-dimethyl-ammonium) bromide
bacitracinum bacitracin	
benethamini penicillinum benethamine penicillin	benzylpenicillin salt of *N*-benzyl-β-phenylethylamine
benzalkonii chloridum benzalkonium chloride	mixture of alkylbenzyldimethylammonium chlorides
benzethonii chloridum benzethonium chloride	benzyldimethyl-*p*-(1,1,3,3-tetramethylbutyl) phenoxyethoxyethyl-ammonium chloride
benzododecinium benzododecinium	dimethylbenzyldodecylammonium
benzoestrolum benzoestrol	3-ethyl-2,4-bis (*p*-hydroxyphenyl) hexane
benzpyrinii bromidum benzpyrinium bromide	1-benzyl-3-(dimethylcarbamyloxy) pyridinium bromide
bibrocatholum bibrocathol	bismuth derivative of tetrabromopyrocatechol
camphotamidum camphotamide	camphosulfonyl-*N*-methylpyridine-β-diethyl-carbonamide
caramiphenii chloridum caramiphenium chloride	diethylaminoethyl-1-phenylcyclopentane-1-carboxylate hydrochloride
carbromalum carbromal	α-bromo-α-ethylbutyrylurea
cetobemidonum ketobemidone	4-*m*-hydroxyphenyl-1-methyl-4-propionoyl-piperidine
cetrimonium cetrimonium	cetyltrimethylammonium
cetylpyridinii chloridum cetylpyridinium chloride	
chloramphenicolum chloramphenicol	D(-)-threo-1-*p*-nitrophenyl-2-dichloroacetamido-1,3-propanediol
chlorazodinum chlorazodin	α,α′-azo-bis(chloroformamidine)

Recommended International Non-Proprietary Name (Latin, English)	*Chemical Name or Description*
chlornaphazinum chlornaphazine	2,2′-dichlorodiethyl-β-naphthylamine
chloropyrilenii citras chloropyrilenium citrate	*N,N*-dimethyl-*N′*-(2-pyridyl)-*N′*-(5-chloro-2-thienyl) ethylenediamine citrate
chlorquinaldolum chlorquinaldol	5,7-dichloro-8-hydroxy-2-methylquinoline
cinchocainii chloridum cinchocainium chloride	hydrochloride of the β-diethylaminoethylamide of 2-butyloxycinchoninic acid
cinchophenum cinchophen	2-phenylquinoline-4-carboxylic acid
cocarboxylasum cocarboxylase	pyrophosphoric ester of thiamine
corticotrophinum corticotrophin	adrenocorticotrophic hormone
cyanocobalaminum cyanocobalamin	vitamin B_{12}
cyclobarbitalum cyclobarbital	5-(1-cyclohexenyl)-5-ethylbarbituric acid
cyclopentaminum cyclopentamine	*N*-α-dimethylcyclopentylethylamine
cyclopropanum cyclopropane	
decamethonium decamethonium	decamethylene-1,10-bistrimethylammonium
diaphenylsulfonum diaphenylsulfone	4,4′-diaminodiphenylsulfone
dichlorophenarsini hydrochloridum dichlorophenarsine hydrochloride	3-amino-4-hydroxyphenyl dichlorarsine hydrochloride
diethylcarbamazinum diethylcarbamazine	1-diethylcarbamoyl-4-methylpiperazine
digitoxosidum digitoxoside	one of the heterosides of the leaf of *Digitalis purpurea* L.
dihydrostreptomycinum dihydrostreptomycin	
dihydrotachysterolum dihydrotachysterol	
diiodohydroxyquinolinum diiodohydroxyquinoline	8-hydroxy-5,7-diiodoquinoline
dimenhydrinatum dimenhydrinate	2-(diphenylmethoxy)-*N,N*-dimethylethylammonium 8-chlorotheophyllinate
dimercaprolum dimercaprol	2,3-dimercaptopropanol
dimethiodalum natricum dimethiodal sodium	sodium diiodomethanesulfonate
dimethyltubocurarinii chloridum dimethyltubocurarinium chloride	

Recommended International Non-Proprietary Name (Latin, English)	*Chemical Name or Description*
dimoxylinii phosphas dimoxylinium phosphate	6,7-dimethoxy-1-(4′ethoxy-3′-methoxybenzyl) 3-methyl*iso*quinolinium phosphate
diperodoni hydrochloridum diperodon hydrochloride	3-(1-piperidyl)-1,2-propanediol dicarbanilate hydrochloride
diphenanum diphenan	4-benzylphenyl carbamate
diphenhydramini hydrochloridum diphenhydramine hydrochloride	β-benzhydryl 2-dimethylaminoethyl ether hydrochloride
diprophyllinum diprophylline	dihydroxypropyltheophylline
disulfiramum disulfiram	tetraethylthiuram disulfide
dixanthogenum dixanthogen	diethyldixanthogen
doxylaminii succinas doxylaminium succinate	2-[α-(2-dimethylaminoethoxy)-α-methylbenzyl] pyridine succinate
eucatropinum eucatropine	4-hydroxy-1,2,2,6-tetramethylpiperidine phenyl-glycollate
fumagillinum fumagillin	an antibiotic substance produced by certain strains of *Aspergillus fumigatus*
furtrethonii iodidum furtrethonium iodide	furfuryltrimethylammonium iodide
glucosulfamidum glucosulfamide	glucose sodium bisulfite compound of sulfanilamidomethanol
glucosulfonum glucosulfone	*p,p′*-diaminodiphenylsulfone-*N,N′*-di-(glucose sodium sulfonate)
gonadotrophinum chorionicum chorionic gonadotrophin	contains the gonad-stimulating substance obtained from the urine of pregnant women
gonadotrophinum sericum serum gonadotrophin	contains the follicle-stimulating substance obtained from the serum of pregnant mares
gramicidinum gramicidin	
heptaminolum heptaminol	2-amino-6-methylheptan-6-ol
hexachlorophenum hexachlorophene	di-(2-hydroxy-3,5,6-trichlorophenyl) methane
hexamethonium hexamethonium	hexamethylene-1,6-bistrimethylammonium
hexobarbitalum hexobarbital	5-(1-cyclohexenyl)-1,5-dimethyl-barbituric acid
hexoestrolum hexoestrol	3,4-di-(*p*-hydroxyphenyl) *n*-hexane
homatropini methylbromidum homatropine methylbromide	
hyaluronidasum hyaluronidase	enzymes of various origins which depolymerize hyaluronic acid

Recommended International Non-Proprietary Name (Latin, English)	*Chemical Name or Description*
hydralazinum hydralazine	1-hydrazinophthalazine
hydrocodoni bitartras hydrocodone bitartrate	dihydrocodeinone acid tartrate
hydromorphoni hydrochloridum hydromorphone hydrochloride	dihydromorphinone hydrochloride
hydroxyprocainum hydroxyprocaine	diethylaminoethanol 4-aminosalicylate
hydroxypyridini tartras hydroxypyridine tartrate	tartrate ester of 3-hydroxypyridine
hydroxytetracainum hydroxytetracaine	2-dimethylaminoethanol 4-*n*-butylamino-salicylate
ibrotamidum ibrotamide	ethyl*iso*propyl-α-bromacetamide
iodetrylum iodetryl	ethyl diiodostearate
iodophthaleinum natricum iodophthalein sodium	disodium salt of tetraiodophenolphthalein
iodothiouracilum iodothiouracil	4-hydroxy-5-iodo-2-mercaptopyrimidine
iproniazidum iproniazid	1-*iso*nicotinyl-2-*iso*propylhydrazide
isomethadonum isomethadone	6-dimethylamino-4,4-diphenyl-5-methyl-3-hexanone
isoprenalinum isoprenaline	1-(3′,4′-dihydroxyphenyl)-2-*iso*propylamino-ethanol
khellinum khellin	5,8-dimethoxy-3-methyl-6,7-furano-chromone, extracted from the fruits of *Ammi visnaga* (L.) Lam.
levomethorphanum levomethorphan	(-) 3-methoxy-*N*-methylmorphinan
maleylsulfathiazolum maleylsulfathiazole	maleyl-*p*-aminophenylsulfonamidothiazole
medrylaminum medrylamine	β-dimethylaminoethyl-*p*-methoxybenzhydryl ether
mephenesinum mephenesin	1,2-dihydroxy-3-(2′-methylphenoxy)-propane
mepyraminum mepyramine	*N*-*p*-methoxybenzyl-*N*′,*N*′dimethyl-*N*-2-pyridylethylenediamine
meralluridum meralluride	mixture of methoxyoxymercuripropyl-succinylurea and theophylline
merbrominum merbromin	disodium salt of 2,7-dibromo-4-hydroxy-mercurifluoresceine
mercaptaminum mercaptamine	β-mercaptoethylamine
mercaptomerinum mercaptomerin	disodium salt of *N*-(3-carboxymethylmercapto-mercuri-2-methoxy)-propylcamphoramic acid

Recommended International Non-Proprietary Name (Latin, English)	*Chemical Name or Description*
mercuderamidum mercuderamide	hydroxymercuripropanolamide of *o*-carboxyphenoxyacetic acid
mercurobutolum mercurobutol	4-*tert*-butyl-2-chloromercuriphenol
mercurophyllinum mercurophylline	mixture of the sodium salt of the β-methoxy-γ-hydroxymercuripropylamide of trimethylcyclopentanedicarboxylic acid and theophylline
metaraminoli bitartras metaraminol bitartrate	(−) 1-*m*-hydroxyphenyl-2-amino-1-propanol hydrogen (+) tartrate
methacholinii chloridum methacholinium chloride	acetyl-β-methylcholinium chloride
methandriolum methandriol	17α-methyl-3β,17β-dihydroxyandrostene-5
methaphenilenum methaphenilene	*N*,*N*-dimethyl-*N*-phenyl-*N*-(2-thienylmethyl) ethylenediamine
methapyrilenum methapyrilene	*N*,*N*-dimethyl-*N*′-(2-pyridyl)-*N*′-(2-thienyl) ethylenediamine
metharbitalum metharbital	5,5-diethyl-1-methyl barbituric acid
methenaminii tetraiodidum methenaminium tetraiodide	hexamethylenetetraminium tetraiodide
methenaminum methenamine	hexamethylenetetramine
methestroli dipropionas methestrol dipropionate	4,4′-(1,2-diethylethylene)di-*o*-cresol dipropionate
methiodalum natricum methiodal sodium	sodium iodomethanesulfonate
methylbenzethonii chloridum methylbenzethonium chloride	benzyldimethyl-2-[2-(*p*-1,1,3,3-tetramethyl-butyl-cresoxy) ethoxy] ethylammonium chloride
methylergometrinii tartras methylergometrinium tartrate	D-lysergic acid 2-butanolamide tartrate
methylphenobarbitalum methylphenobarbital	*N*-methyl-5-ethyl-5-phenylbarbituric acid
methylrosanilinii chloridum methylrosanilinium chloride	crystal violet
methylthioninii chloridum methylthioninium chloride	tetramethylthioninium chloride
methylthiouracilum methylthiouracil	4-methyl-2-thiouracil
monoaethanolaminii oleas monoethanolaminium oleate	
nalorphinum nalorphine	*N*-allylnormorphine
naphazolinum naphazoline	2-(1-naphthylmethyl) imidazoline

Recommended International Non-Proprietary Name (Latin, English)	*Chemical Name or Description*
natrii ascorbas sodium ascorbate	
natrii aurothiomalas sodium aurothiomalate	mainly the sodium salt of aurothiomalic acid
natrii cyclamas sodium cyclamate	sodium cyclohexylsulfamate
natrii dehydrocholas sodium dehydrocholate	
natrii gentisas sodium gentisate	sodium 5-hydroxysalicylate
natrii morrhuas sodium morrhuate	the sodium salts of the fatty acids of cod-liver oil
natrii stibogluconas sodium stibogluconate	sodium antimonylgluconate
natrii tetradecylis sulfas sodium tetradecyl sulfate	sodium 7-ethyl-2-methylundecyl-4-sulfate
nicopholinum nicopholine	morpholine nicotinic acid amide
nitrosulfathiazolum nitrosulfathiazole	2-(*p*-nitrophenylsulfonamido) thiazole
octamylaminum octamylamine	*iso*amylaminomethylheptane
oxapropanii iodidum oxapropanium iodide	1-dimethylaminomethylene-2,3-dioxypropane iodomethylate
oxophenarsini hydrochloridum oxophenarsine hydrochloride	3-amino-4-hydroxy-phenyl arsenoxide hydrochloride
oxycodoni hydrochloridum oxycodone hydrochloride	dihydrohydroxycodeinone hydrochloride
oxydipentonii chloridum oxydipentonium chloride	5,5′-bis(trimethylammonium)dipentyl ether dichloride
oxyphenonii bromidum oxyphenonium bromide	diethyl-2(-hydroxyethyl)methylammonium bromide α-phenyl-α-cyclohexylglycolate
oxytetracyclinum oxytetracycline	an antibiotic substance produced by the growth of *Streptomyces rimosus*, or the same substance produced by any other means
paramethadionum paramethadione	3,5-dimethyl-5-ethyloxazolidine-2,4-dione
parethoxycainum parethoxycaine	diethylaminoethanol 4-ethoxybenzoate
paroxypropionum paroxypropione	4-hydroxypropiophenone
pentaerithrityli tetranitras pentaerithrityl tetranitrate	
pentamethonium pentamethonium	pentamethylene-1,5-bistrimethylammonium
pentamidinum pentamidine	*p′-p′*-diamidino-diphenoxy-pentane

Recommended International Non-Proprietary Name (Latin, English)	*Chemical Name or Description*
pentobarbitalum pentobarbital	5-ethyl-5-(1-methylbutyl) barbituric acid
phenacemidum phenacemide	phenylacetylurea
phenadoxonum phenadoxone	6-morpholino-4,4-diphenylheptan-3-one
phenicarbazidum phenicarbazide	phenylsemicarbazide
phenindaminum phenindamine	2-methyl-9-phenyl-2,3,4,9-tetrahydro-1-pyridindene
pheniodolum natricum pheniodol sodium	sodium α-phenyl-β-(4-hydroxy-3,5-diiodophenyl) propionate
phenododecinium phenododecinium	dodecyldimethyl-2-phenoxyethylammonium
phenothiazinum phenothiazine	
phentolaminum phentolamine	2-(*m*-hydroxy-*N*-*p*-tolylanilinomethyl)-2-imidazoline
phenylbutazonum phenylbutazone	3,5-dioxo-1,2-diphenyl-4-*n*-butylpyrazolidine
pholcodinum pholcodine	morpholinylethylmorphine
pholedrinii sulfas pholedrinium sulfate	β-(*p*-hydroxyphenyl) *iso*propylmethylammonium sulfate
phthalylsulfathiazolum phthalylsulfathiazole	(*o*-carboxybenzoyl)-*p*-aminophenyl-sulfonamido-thiazole
piperocainii chloridum piperocainium chloride	3-benzoxy-1-(2-methylpiperidino) propane hydrochloride
piperoxani hydrochloridum piperoxan hydrochloride	2-(1-piperidylmethyl)1,4-benzodioxan hydrochloride
piridocainum piridocaine	β-(2-piperidyl) ethyl *o*-aminobenzoate
pregnenolonum pregnenolone	3-hydroxy-20-keto-pregnene-5
primaquinum primaquine	8-(4-amino-1-methylbutylamino)-6-methoxyquinoline
probarbitalum natricum probarbital sodium	sodium derivative of 5-ethyl-5-*iso*propylbarbituric acid
procainamidum procainamide	4-amino-(2-diethylaminoethyl) benzamide
procyclidinum procyclidine	1-phenyl-1-cyclohexyl-3-pyrrolidino-propan-1-o1 hydrochloride
promethazini hydrochloridum promethazine hydrochloride	(dimethylamino-2′-methyl-2′ethyl)-*N*-dibenzoparathiazine hydrochloride
propamidinum propamidine	α,ω-(4,4′-diamidinodiphenoxy) propane

Recommended International Non-Proprietary Name (Latin, English)	*Chemical Name or Description*
propanthelini bromidum propantheline bromide	β-di*iso*propylaminoethyl xanthene-9-carboxylate methylbromide
propyliodonum propyliodone	propyl-3,5-diiodo-4-pyridone acetate
propylthiouracilum propylthiouracil	2-mercapto-4-hydroxy-6-*n*-propylpyrimidine
propyphenazonum propyphenazone	1-phenyl-2,3-dimethyl-4-*iso*propyl-5-pyrazolone
pyridoxinii chloridum pyridoxinium chloride	4,5-di(hydroxymethyl)-3-hydroxy-2-methyl-pyridinium chloride
pyrimethaminum pyrimethamine	2,4-diamino-5-*p*-chlorophenyl-6-ethylpyrimidine
pyroxylinum pyroxylin	soluble guncotton
racemethorphanum racemethorphan	(±) 3-methoxy-*N*-methylmorphinan
racemorphanum racemorphan	(±) 3-hydroxy-*N*-methylmorphinan
rutosidum rutoside	3-rhamnoglucoside of 5,7,3′,4′-tetrahydroxy-flavonol
salacetamidum salacetamide	*N*-acetylsalicylamide
salazosulfamidum salazosulfamide	*p*-sulfonamidophenylazosalicylic acid
salazosulfathiazolum salazosulfathiazole	*p*-aminophenylsulfonamidothiazole-azosalicylic acid
salicylamidum salicylamide	2-hydroxybenzamide
solutio natrii chloridi composita compound solution of sodium chloride	synonym : Ringer's solution
solutio natrii lactatis composita compound solution of sodium lactate	synonym : Ringer's lactate solution
stearylsulfamidum stearylsulfamide	stearylsulfanilamide
stibamini glucosidum stibamine glucoside	*N*-glucoside of sodium 4-aminophenylstibonate
streptomycinum streptomycin	
subathizonum subathizone	4-ethylsulfonylbenzaldehyde thiosemicarbazone
sulfacetamidum sulfacetamide	*p*-aminophenylsulfonacetamide
sulfadimidinum sulfadimidine	2-sulfanilamido-4,6-dimethylpyrimidine
sulfisomidinum sulfisomidine	2,4-dimethyl-6-sulfanilamidopyrimidine

Recommended International Non-Proprietary Name (Latin, English)	*Chemical Name or Description*
sulfogaiacolum sulfogaiacol	potassium guaiacolsulfonate
suraminum natricum suramin sodium	symmetrical urea of the sodium salt of *m*-benzoyl-*m*-amino-*p*-methyl-benzoyl-1-aminonaphthalene 4,6,8-trisulfonic acid
suxethonii chloridum suxethonium chloride	bis-(2-dimethylaminoethyl) succinate bisethochloride
thiacetarsamidum natricum thiacetarsamide sodium	disodium salt of *p*-[bis-(carboxymethyl-mercapto)arsino] benzamide
thiazosulfonum thiazosulfone	2,4′-diaminothiazolylphenylsulfone
thioacetazonum thioacetazone	4-acetamidobenzaldehyde thiosemicarbazone
thiodiglycolum thiodiglycol	2,2′-dihydroxyethyl sulfide
thonzylaminii chloridum thonzylaminium chloride	*N*,*N*-dimethyl-*N*′-(*p*-methoxybenzyl)-*N*′-(2-pyrimidyl) ethylenediamine hydrochloride
tocamphylum tocamphyl	diethanolamine salt of tolylmethyl carbinol mono-D-camphoric acid ester
tolazolinum tolazoline	2-benzylimidazoline
trichloroethylenum trichlorethylene	
trihexyphenidyli hydrochloridum trihexyphenidyl hydrochloride	1-cyclohexyl-1-phenyl-3-piperidino-1-propanol hydrochloride
trimethadionum trimethadione	3,5,5-trimethyloxazolidine-2,4-dione
tripelennamini hydrochloridum tripelennamine hydrochloride	*N*-benzyl-*N*′, *N*′-dimethyl-*N*-2-pyridyl-ethylenediamine hydrochloride
tuaminoheptanum tuaminoheptane	1-methylhexylamine
tubocurarini chloridum tubocurarine chloride	D-tubocurarine chloride
tyrothricinum tyrothricin	
urethanum urethane	ethyl carbamate
vanyldisulfamidum vanyldisulfamide	4′-oxy-5′-methoxy-1-benzylidene-bis-(aminophenylsulfonamide)
vinbarbitalum vinbarbital	5-ethyl-5-(1-methyl-1-butenyl) barbituric acid

In accordance with paragraph 8 of the Procedure, and in the interest of public health, the Director-General has requested[2] that these names be recognized as the non-proprietary names for the substances in question and that the necessary steps be taken to prevent the acquisition of proprietary rights in the names, including prohibition of registration of the names as trade-marks or trade-names.

[2] Circular letter C.L. 13.1955, P5/438/3, 25 April 1955

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